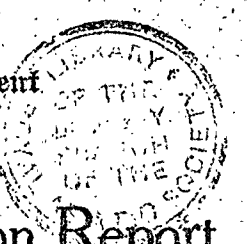
12 OCT. 1935

Public Works Department
Bombay Presidency



Irrigation Administration Report

Part II—Sind

For the Year 1932-33

[Price—Rs. 2 As. 9 *or* 4*s.* 9*d.*]

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Nara Cut R. D. 7,000.

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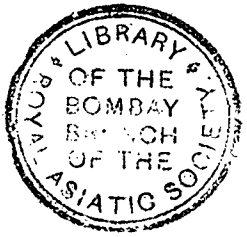

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DIAGRAM

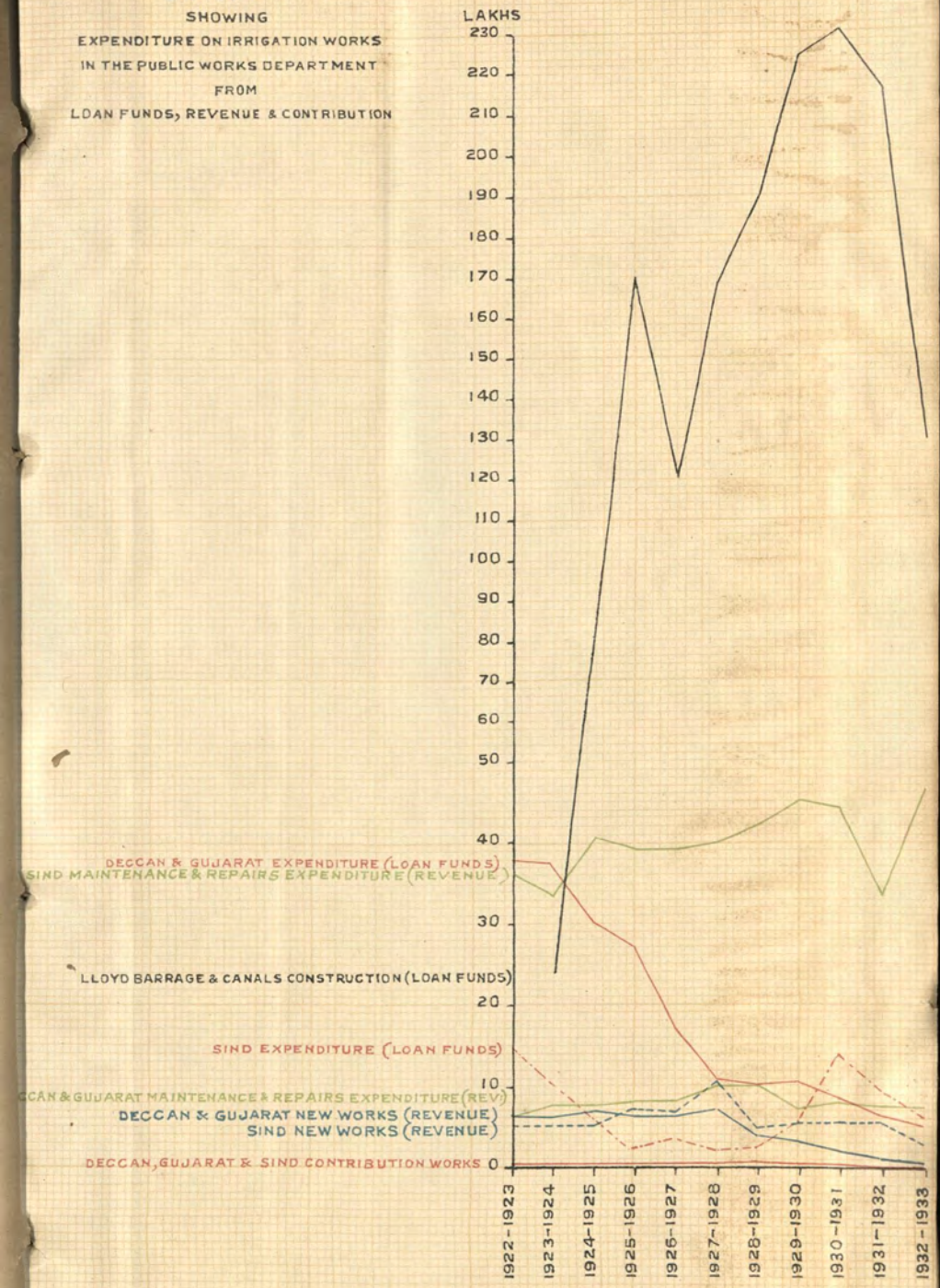
SHOWING

EXPENDITURE ON IRRIGATION WORKS

IN THE PUBLIC WORKS DEPARTMENT

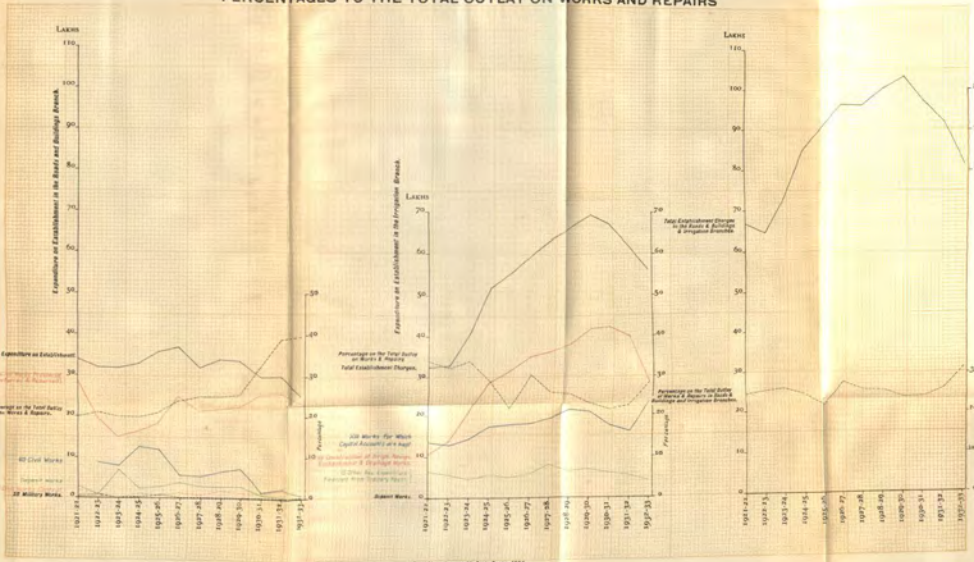
FROM

LOAN FUNDS, REVENUE & CONTRIBUTION



G.P.Z.O. Poona, 1934.

DIAGRAM SHOWING EXPENDITURE
ON ESTABLISHMENT
IN THE
ROADS & BUILDINGS & IRRIGATION BRANCHES
OF THE
PUBLIC WORKS DEPARTMENT
AND
PERCENTAGES TO THE TOTAL OUTLAY ON WORKS AND REPAIRS


Lakhs
Expenditure on Establishment in the Roads and Buildings Branch.
Total Expenditure on Establishment
Percentage on the Total Outlay on Works & Repairs.
Percentage
Lakhs
Expenditure on Establishment in the Irrigation Branch.
Percentage on the Total Outlay on Works & Repairs
Total Establishment Charges.
Percentage
Lakhs
Total Establishment Charges in the Roads & Buildings & Irrigation Branches.
Percentage on the Total Outlay on Works & Repairs in Roads & Buildings and Irrigation Branches.
Percentage

Civil Photolithographic Dept., Poona, 1934.

Statement showing expenditure on establishment in the Roads and Buildings and the Irrigation Branches of the P. W. D. from the year 1921-22 to 1932-33 and percentage on the total outlay on works and repairs during that period in both the Branches.

Year.	Expenditure on Establishment in the Roads and Buildings Branch.							Expenditure on Establishment in the Irrigation Branch.
	41—Civil Works—Provincial (Transferred and Reserved).	60—Civil Works.	41—Civil Works—Central.	50—Military Works.	Deposit Works.	Total.	Percentage on the total outlay on works and repairs in the Roads and Buildings Branch.	55—Construction of Irrigation, Navigation, Embankment and Drainage Works.
1	2	3	4	5	6	7	8	9
	Rs.	Rs.	Rs.	Rs.	Rs	Rs.		Rs.
1921-22 ..	29,06,955	..	1,98,683	45,258	2,84,992	34,35,888	19·26	11,53,734
1922-23 ..	20,14,640	8,34,450	1,78,163	71,481	77,143	31,75,877	20·79	14,20,751
1923-24 ..	15,84,488	8,10,645	67,892	38,560	6,88,354	31,89,939	19·88	21,87,793
1924-25 ..	16,89,892	12,25,632	1,19,721	27,862	2,52,556	33,15,663	19·67	29,10,785
1925-26 ..	18,89,417	12,05,078	1,01,876	69,049	2,58,535	35,23,955	20·66	32,21,647
1926-27 ..	25,30,286	5,97,486	1,68,896	5,882	3,94,389	36,96,939	23·76	35,56,959
1927-28 ..	21,99,448	5,59,107	1,49,132	5,042	2,97,270	32,09,999	24·96	36,98,956
1928-29 ..	22,40,393	6,56,713	2,29,540	2,240	2,56,180	33,85,066	25·03	39,04,670
1929-30 ..	22,45,450	7,33,867	1,56,773	3,638	2,34,897	33,74,625	25·26	42,26,873
1930-31 ..	25,51,711	1,80,139	1,72,163	2,415	85,444	29,91,872	32·35	42,88,966
1931-32 ..	25,93,104	2,32,929	1,22,799	3,182	44,132	29,96,146	38·70	40,37,972
1932-33 ..	23,74,603	71,981	85,143	3,334	17,156	25,52,217	39·79	28,70,427

Year.	Expenditure on Establishment in the Irrigation Branch—*contd.*					Total Establishment charges in the Roads and Buildings and Irrigation Branches.	Percentage on the total outlay of works and repairs in Roads and Buildings and Irrigation Branches.
	XIII—Works for which capital accounts are kept.	15—Other Revenue Expenditure financed from Ordinary Revenues.	Deposit Works.	Total Establishment charges.	Percentage on the total outlay on works and repairs in the Irrigation Branch.		
1	10	11	12	13	14	15	16
	Rs.	Rs.	Rs.	Rs.		Rs.	
1921-22 ..	13,85,960	6,68,651	2,770	32,11,115	33·59	66,47,003	24·26
1922-23 ..	13,44,901	5,34,327	1,993	33,01,972	32·22	64,77,849	25·38
1923-24 ..	14,43,222	4,32,013	2,056	40,65,084	33·89	72,55,023	25·87
1924-25 ..	17,37,724	5,26,361	492	51,75,362	28·73	84,91,025	24·35
1925-26 ..	17,99,343	5,19,228	2,681	55,42,899	21·62	90,66,854	21·23
1926-27 ..	18,08,385	5,94,989	3,207	59,63,540	30·56	96,60,479	27·54
1927-28 ..	19,20,773	7,80,312	3,847	64,03,888	26·00	96,13,887	25·64
1928-29 ..	21,35,939	6,16,601	2,750	66,59,960	25·51	1,00,45,026	25·35
1929-30 ..	21,08,302	6,18,312	1,012	69,54,499	23·26	1,03,29,124	23·88
1930-31 ..	18,31,149	5,99,621	1,734	67,21,470	21·60	97,13,342	24·06
1931-32 ..	16,34,011	5,18,627	86	61,90,696	22·40	91,86,842	25·97
1932-33 ..	23,53,971	4,01,329	680	56,26,407	28·54	81,78,624	31·30

NOTE.—The percentage of the establishment charges on the cost of works and repairs in the Irrigation Branch (column 14) is generally higher than that in the Roads and Buildings Branch (column 8). The reason is largely that the establishment charges in the Irrigation Branch include the cost of Special Revenue Establishment employed entirely on "revenue management" work on certain canal systems in Sind and the Deccan which has no connection with the execution of works and repairs, and that these charges also include cost of part of the time of Irrigation establishment spent on revenue management including the *control and distribution of water*, which is debited in the accounts to "revenue management" and not to execution of works and repairs. If these establishment charges debited in the accounts to "revenue management" are deducted from the total cost of establishment in the Irrigation Branch the percentage on the cost of works and repairs will not be so divergent. The increase in the rate per cent. in the R. & B. Branch is mainly due to decrease in outlay on "works" and "repairs". Establishment charges cannot be reduced in the same ratio in which expenditure on works is reduced. A mere overall percentage on expenditure on works is inaccurate.

IRRIGATION ADMINISTRATION REPORT, PART II—SIND—1932-33.

1. DESCRIPTION OF IRRIGATION.

1. The Province of Sind is situated beyond the influence of the south-west and the north-east monsoons, and in consequence its rainfall is normally scanty and unreliable. Unlike the greater part of India, therefore, the area of cultivation in Sind that depends solely or mainly upon rainfall is insignificant. The river Indus, however, brings down abundant supplies of water, the discharge at Sukkur rarely falling below 22,000 cusecs, while the average is as high as 110,000 cusecs. From where it enters the Province of Sind, the river is generally in deltaic formation, flowing along an elevated ridge formed by its own alluvial deposits. The indigenous system of irrigation by inundation canals took advantage of this physical peculiarity. The device was primitive; a channel was cut from the river approximately at right angles to its course; after a short distance the canal deviated to an alignment parallel to the river and commanded the low-lying lands falling away from the marginal ridge. The old irrigation works have been improved and extended while scientific methods have been introduced into the design and control of these canals, and many of them have been provided with head regulators. There are, however, inherent defects in this method of irrigation. The cultivation dependent on river inundations is principally kharif, and even this is subject to insecurity of supply owing to fluctuations in the river levels. The low water supplies available during the Winter season could be tapped only to a small extent and therefore this water largely ran to waste in the sea. As a result of the vagaries of a constantly changing river the inundation canals inevitably suffered from deficiency of supply during critical irrigation periods. The above defects in irrigation have been remedied in CENTRAL SIND from the year 1932 by the opening of the Lloyd Barrage at Sukkur and the flowing of the perennial canals taking off above it. It is only in parts of UPPER and LOWER Sind, which are outside the sphere of influence of the Barrage, that a 'Kharif' water supply only continues to be available from the inundation canals. 'Bosi-Rabi' crops, however, are grown to a considerable extent in these areas, especially if the 'abkalani' has been a late one.

2. NATURE OF INUNDATION AND RAINFALL.

2. The inundation of 1932 was poor in the beginning as the river remained remarkably low from April to the beginning of July and although it rose gradually after that and maintained a level sufficient for the requirements of irrigation, it fell early and the canals in Lower Sind were adversely affected. The inundation may be said to have been fairly

satisfactory so far as Upper Sind is concerned but rather poor in Lower Sind.

3. With the Barrage in operation, Bukkur gauge has ceased to be a reference gauge and the Sarhad gauge is now the reference gauge for the inundation canals in Upper Sind. During the year under report the fair irrigating level of 11·0′ was obtained on this gauge for 49 days only the maximum reading obtained being 14·2 feet.

4. The maximum level obtained at the Barrage itself with all gates fully open was R. L. 196·95 against 195·00 the normal pond level. The maximum discharge obtained in the river at Sukkur was 571,986 cusecs.

5. The fair irrigating level of 17 feet on the Kotri gauge was first reached on the 21st July and this reading of 17 feet and over was maintained for a period of 51 days, against 63 days during 1931, 73 days during 1930 and 58 days during 1929 ; the average of the last 3 years being 65 days.

The highest reading on the Kotri gauge recorded this year was 23·7 feet on the 18th August as compared with 19·3 feet in 1931 and 24·1 feet the highest on record.

6. The rainfall throughout the whole of Sind was good and timely and the crops benefited considerably from it.

3. GENERAL REVIEW OF THE RESULTS OF THE YEAR 1932-33.

Area of Cultivation, Government, Jagir and Foreign.

7. The gross assessed areas in Sind for the year are given in the sub-joined Statement A :—

Statement A.

Year and Class of Crops.	55—Construction of Irrigation, Navigation, Embankment and Drainage Works not charged to Revenue. A—Irrigation Works.			15—Other Revenue expenditure financed from ordinary Revenue. A—Irrigation Works for which neither Capital nor Revenue Accounts are kept.	Grand total.
	Productive.	Unproductive	Total.		
1	2	3	4	5	6
	Acres.	Acres.	Acres.	Acres.	Acres.
Average for 3 years ending 1931-32. Kharif..	1,868,299	672,214	2,540,513	41,815	2,582,328
Rabi ..	455,974	141,224	597,198	43,646	640,844
Total ..	2,324,273	813,438	3,137,711	85,461	3,223,172

Statement A—contd.

Year and Class of Crops.		55—Construction of Irrigation, Navigation, Embankment and Drainage Works not charged to Revenue. A—Irrigation Works.			15—Other Revenue expenditure financed from ordinary Revenue. A—Irrigation Works for which neither Capital nor Revenue Accounts are kept.	Grand total.
		Productive.	Unproductive.	Total.		
1		2	3	4	5	6
		Acres.	Acres.	Acres.	Acres.	Acres.
1931-32 ..	Kharif ..	1,745,123	626,386	2,371,509	37,095	2,408,604
	Rabi ..	449,924	172,430	622,354	29,093	651,447
	Total ..	2,195,047	798,816	2,993,863	66,188	3,060,051
1932-33 ..	Kharif ..	2,376,990	82,820	2,459,810	18,479	2,478,289
	Rabi ..	982,091	21,528	1,003,619	15,321	1,018,940
	Total ..	3,359,081	104,348	3,463,429	33,800	3,497,229
Increase or decrease as compared with the average.	Kharif ..	508,691	−589,394	−80,703	−23,336	−104,039
	Rabi ..	526,117	−119,696	406,421	−28,325	378,096
	Total ..	1,034,808	−709,090	325,718	−51,661	274,057
Increase or decrease as compared with the year 1931-32.	Kharif ..	631,867	−543,566	88,301	−18,616	69,685
	Rabi ..	532,167	−150,902	381,265	−13,772	367,493
	Total ..	1,164,034	−694,468	469,566	−32,388	437,178

The total cultivation of the year shows an increase of 437,178 and 274,057 acres as compared with the figures for the last year and the average of the previous 3 years respectively. The area under Kharif shows an

increase of 69,685 acres and a decrease of 104,039 acres respectively, compared with the areas of the last year and with the average of the previous triennium. The area under rabi shows respectively an increase of 367,493 and 378,096 acres. The increase in cultivation is due to the functioning of the new Barrage Canals.

The area under 'Dubari' (twice cropped lands) which is not included in Statement A, was 437,910 acres. The 'Dubari' figures for the previous year and the average of the previous 3 years were 432,080 and 446,847 acres respectively.

Consolidated Assessment, Government and Jagir.

8. The net consolidated assessment including Hakabo on Foreign and Jagir lands, after deducting remission is given in the following statement B :—

Statement B.

Year and Class of Crops.		55—Construction of Irrigation, Navigation, Embankment and Drainage Works not charged to Revenue. A—Irrigation.			15—Other Revenue expenditure financed from ordinary Revenues. A—Irrigation Works for which neither Capital nor Revenue Accounts are kept.	Grand total.
		Productive.	Unproductive.	Total.		
1		2	3	4	5	6
		Rs.	Rs.	Rs.	Rs.	Rs.
Average of past 3 years including 1931-32.	Kharif..	50,82,777	14,11,821	64,94,598	87,733	65,82,331
	Rabi ..	10,90,708	4,00,092	14,90,800	75,590	15,66,390
	Total ..	61,73,485	18,11,913	79,85,398	1,63,323	81,48,721
1931-32 ..	Kharif..	51,03,742	16,66,280	67,70,022	88,776	68,58,798
	Rabi ..	10,32,213	4,69,657	15,01,870	50,596	15,52,466
	Total ..	61,35,955	21,35,937	82,71,892	1,39,372	84,11,264

Statement B—contd.

Year and Class of Crops.		55—Construction of Irrigation, Navigation, Embankment and Drainage Works not charged to Revenue. A—Irrigation.			15—Other Revenue expenditure financed from ordinary Revenues. A—Irrigation Works for which neither Capital nor Revenue Accounts are kept.	Grand total.
		Productive.	Unproductive.	Total.		
1		2	3	4	5	6
		Rs.	Rs.	Rs.	Rs.	Rs.
1932-33	Kharif ..	80,26,096	1,82,313	82,08,409	32,781	82,41,190
	Rabi ..	35,60,746	63,082	36,23,828	27,327	36,51,155
	Total ..	1,15,86,842	2,45,395	1,18,32,237	60,108	1,18,92,345
Increase or decrease as compared with the average.	Kharif ..	29,43,319	—12,29,508	17,13,811	— 54,952	16,58,859
	Rabi ..	24,70,038	— 3,37,010	21,33,028	— 48,263	20,84,765
	Total ..	54,13,357	—15,66,518	38,46,839	— 1,03,215	37,43,624
Increase or decrease as compared with the year 1931-32.	Kharif ..	29,22,354	—14,83,967	14,38,387	— 55,995	13,82,392
	Rabi ..	25,28,533	— 4,06,575	21,21,958	— 23,269	20,98,689
	Total ..	54,50,887	—18,90,542	35,60,345	— 79,264	34,81,081

The net assessed revenue shows an increase of Rs. 34,81,081 and Rs. 37,43,624 respectively as compared with the figures for the last year and the average of the previous three years. The increase in assessment is due to new land having been brought under cultivation by the functioning of the Barrage Canals and higher rates of assessment.

Cultivation on river spill.

9. The area cultivated on spill water was 67,035 acres, compared with 12,693 acres during the last year and 75,245 acres, the average of the previous triennium.

Assessment rate per acre on Government land.

10. The average net consolidated assessment, per acre, on Government land, compared with that of the previous year and the average of the previous 3 years is shown below :—

——	Average of previous 3 years.	1931-32.	1932-33.
		Rupees per acre.	
55—Construction of Irrigation, Navigation, Embankment and Drainage Works, not charged to Revenue—			
(1) Productive	2·74	2·96	3·67
(2) Unproductive	2·32	2·63	2·36
15—Other Revenue Expenditure financed from ordinary Revenues Works for which neither Capital nor Revenue Accounts are kept	2·03	2·23	2·13
Average of all works ..	2·66	2·92	3·62

The increase on productive works is due to higher rates of assessment charged on lands commanded by the Barrage Canals.

Actual realizations under all heads and the balances outstanding.

11. The following statement shows the realizations under all heads and the balances outstanding at the end of the year :—

Statement C.

Years.	Collections.				Balance outstanding.
	Government land and Hakabo.	Miscellaneous.	4 per cent. Irrigation share of proceeds for sale of occupancy rights.	Total Receipts.	
1	2	3	4	5	6
	Rs.	Rs.	Rs.	Rs.	Rs.
Average of past three years.	70,92,305	1,53,981	2,52,240	74,98,526	11,77,127
1931-32 ..	80,19,359	1,39,815	2,62,528	84,21,702	11,28,113
1932-33 ..	1,06,16,122	1,70,476	3,21,716	1,11,08,314	12,80,933
Increase or decrease as compared with 1931-32.	25,96,763	30,661	59,188	26,86,612	1,52,820
Increase or decrease as compared with the average of three years ..	35,23,817	16,495	69,476	36,09,788	1,03,806

The balance outstanding at the end of the year shows an increase of Rs. 1,52,820 and Rs. 1,03,806, compared with the figures of the previous year and the average of the past three years respectively. The percentage of outstandings is, however, less this year being 11·5 as compared with 13·4 during the last year.

Remission on Government Land.

12. The remission on Government land granted during the year amounted to Rs. 23,35,108 compared with Rs. 16,67,136 and Rs. 23,78,886 of the previous year and the average of the previous three years respectively. The percentage of remission on the gross assessment during the year was however the same as last year, viz. 16·8.

Remission on Jagir Lands.

13. The remission granted on Jagir land during the year was Rs. 1,844 compared with Rs. 4 granted during the previous year and Rs. 8,690 the average of the previous three years.

Remission on Foreign Land.

14. The remission on lands in Foreign Territory (Kalat) amounted to Rs. 66,904 compared with Rs. 38,374 during the previous year and Rs. 20,793 the average of the previous three years.

15. The following statement shows details of the causes of remissions, with a comparison of the previous year's figures :—

Causes of remissions.	1932-33.	1931-32.	Difference.
	Rs.	Rs.	Rs.
Deficiency of water	8,89,618	5,07,357	3,82,261
Floods, Rains and Erosion	1,63,768	65,202	98,566
Frost	8,399	37,813	—29,414
Special Remission	5,53,904	4,27,385	1,26,519
Percolation	33,448	....	33,448
Blight or Mahlo	6,159	20,295	—14,136
Wireworms and insects..	38,557	1,04,738	—66,181
Rats	37,709	15,227	22,482
Adverse winds	2,46,741	1,437	2,45,304
Kalar	15,752	8,874	6,878
Written off	5,770	186	5,584
Breaches of canals	65,081	2,05,223	—1,40,142
New Settlement	93,228	132	93,096
Locust	....	1,631	—1,631
Other Causes	1,76,974	2,71,636	—94,662
Total ..	23,35,108	16,67,136	6,67,972

16. The loss of Canal Revenue during the year due to the low rates charged to the jagirdars in Sind and zamindars in Kalat Territory amounted to Rs. 6,57,679.

Loss to Canals in Foreign and Jagir Lands.

17. The total charges during the year on account of maintenance and repairs amounted to Rs. 71,81,717 as shown below :—

	Rs.
Works	47,92,626
Establishment and Tools and Plant ..	17,46,543
Percentage charges for Revenue collection	6,42,548
Total ..	71,81,717

The expenditure on establishment charged to works amounted to Rs. 14,28,023 while the net expenditure on works (clearance and repairs) was Rs. 33,64,603. As compared with previous year and the average of the previous three years, the net expenditure on clearance and repairs shows an increase of Rs. 7,88,074 and Rs. 49,814 respectively, which is due to the maintenance of additional lengths of new Barrage Canals.

18. Of the total charges shown in the preceding paragraph, Rs. 58,08,069 were spent on Canals, Rs. 13,24,922 on river embankments and the balance, viz. Rs. 48,726 in the Development and Research Division.

Expenditure on maintenance and repairs separately for Canals and River Embankments.

19. The outlay during the year on new works, including Establishment and Tools and Plant charges was Rs. 10,44,851 as shown below :—

Outlay on New Works.

		Rs.
55—Construction of Irrigation, Navigation, Embankment and Drainage Works, not charged to Revenue—		
Productive	Capital ..	4,99,332
	Revenue ..	13,818
Unproductive	Capital ..	2,08,530
	Revenue ..	1,479
15—Other Revenue Expenditure financed from Ordinary Revenues		3,21,692
	Total ..	10,44,851

20. **Financial Results.** The general financial results of all Irrigation works in Sind are shown in the following statement D :—

Statement D.

Class of Works.	Gross Revenue.	Working Expenses.	Net Revenue.	Simple Interest.	Net Profit 1932-33.	Net Profit 1931-32.	Increase.	Decrease.
1	2	3	4	5	6	7	8	9
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
55—*Construction of Irrigation, Navigation, Embankment and Drainage Works, not charged to Revenue.*								
1. Productive ..	1,08,84,509	56,79,526	52,04,983	41,81,321	10,23,662	27,58,803	....	17,35,141
2. Unproductive ..	2,41,853	1,84,536	57,317	1,05,117	—47,800	—90,771	42,971	....
Total ..	1,11,26,362	58,64,062	52,62,300	42,86,438	9,75,862	26,68,032	....	16,92,170
75—*Other Revenue Expenditure financed from Ordinary Revenues—Works for which neither Capital nor Revenue Accounts are kept.*								
3—Miscellaneous ..	9,91,764	16,95,340	—7,03,576	..	—7,03,576	—6,53,121	....	50,455
1932-33 ..	1,21,18,126	75,59,402	45,58,724	42,86,438	2,72,286	....	....	....
1931-32 ..	93,17,922	55,65,130	37,52,792	17,37,881	..	20,14,911	....	....
Increase or decrease	28,00,204	19,94,272	8,05,932	25,48,557	..	....	....	17,42,625

The decrease of revenue on the productive works as compared with the previous year is due to the inclusion of interest amounting to Rs. 24·79 lakhs on Barrage Works, which functioned for the first time in this year and the full benefit from which is expected to accrue after 10 years.

21. **Expenditure per acre of area irrigated.** The following statement shows the expenditure per acre of area irrigated under all classes of works, excluding the cost of surveys for definite projects :—

Statement E.

Total area irrigated by all classes of works.	Total working expenses and maintenance of canals.	Rate of working expenses per acre of area irrigated (column 2÷1).	Expenditure on agricultural works (excluding cost of surveys for special projects).	Rate of expenditure on agricultural works per acre of area irrigated (column 4÷1).	Total working expenses per acre of area irrigated including expenditure on agricultural works (columns 3+5).
1	2	3	4	5	6
Acres.	Rs.	Rs.	Rs.	Rs.	Rs.
3,497,229	58,64,062	1·68	15,22,873	0·43	2·11

The total working expenses including those on agricultural works amounted to Rs. 2·11 per acre of the total area irrigated, compared with Rs. 1·80 per acre of the area irrigated in the previous year and Rs. 2·02 per acre of the average area irrigated during the past three years.

Lengths of Canals and Bunds.

22. The mileage of main canals in operation during the year was 2,428 and that of branch canals 7,450 or a total of 9,878 as compared with 8,024 miles last year. The large difference in the mileage is due to the opening of the new Barrage Canals. The total lengths of river embankments maintained during the year was 987 miles compared with 941 miles during the previous year.

A flood protective bund was constructed on the right bank to protect the areas in the Barrage Zone from torrents from the Khirtar Hills. The length constructed is 123 miles.

Areas of principal crops: Government, Foreign and Jagir.

23. The areas of principal crops grown during the year are shown in the subjoined statement F :—

Statement F.

Crops.	1932-33.			Average of previous 3 years.	1931-32.	Increase or decrease as compared with Average.	Increase or decrease as compared with 1931-32.
	Lift.	Flow.	Total.				
1	2	3	4	5	6	7	8
Kharif.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Rice ..	183	1,090,501	1,090,684	1,201,585	1,159,487	—110,901	—68,803
Jowari ..	92,164	373,712	465,876	488,725	460,548	—22,849	5,328
Bajri ..	175,377	301,432	476,809	500,606	435,214	—23,797	41,595
Cotton ..	66,808	277,304	344,112	284,045	253,232	60,067	90,880
Sugar-cane ..	1,022	1,924	2,946	*3,193	3,193	—247	—247
Other crops ..	20,120	77,742	97,862	106,431	97,298	—8,569	564
Total ..	355,674	2,122,615	2,478,289	2,584,585	2,408,972	—106,296	69,317
Rabi.							
Wheat ..	73,836	704,714	778,550	399,353	381,210	379,197	397,340
Barley ..	675	8,091	8,766	7,786	5,670	980	3,096
Oilseeds ..	2,770	184,572	187,342	227,499	185,387	—40,157	1,955
Other-crops ..	6,063	476,129	482,192	452,926	510,892	29,266	—28,700
Total ..	83,344	1,373,506	1,456,850	1,087,564	1,083,159	369,286	373,691
Grand Total ..	439,018	3,496,121	3,935,139	3,672,149	3,492,131	262,990	443,008

*This figure pertains to the year 1931-32 only. No separate figure of Sugar-cane is available for the past two years, viz. 1929-30 and 1930-31.

Compared with the previous year and the average of the previous three years, there was an increase of 69,317 acres and a decrease of 106,296 acres, respectively, under *kharif*, and an increase of 373,691 and 369,286 acres, respectively, under *rabi*.

Percentages of Kharif and Rabi.

24. The percentages of Kharif and Rabi areas irrigated during the year were 63 and 37, respectively, compared with 62 and 38 last year.

Percentages of Lift and Flow.

25. The percentages of lift and flow cultivation during the year were 11 and 89, respectively, compared with 17 and 83 in the previous year. The decrease in the lift and corresponding increase in the flow areas was due to the functioning of the new Barrage Canals.

Principal Crops.

26. The principal crops grown during the Kharif were :—

Rice,	Bajri, and
Jowari,	Cotton.

The total area of " rice " was 1,090,684 acres of which 249,624 acres were on the Rice Canal, 236,542 acres on the Fuleli, 80,832 acres on the Eastern Nara and about 171,000 and 164,000 acres in the Karachi and Begari Canals Divisions, respectively.

The total area of " jowari " was 465,876 acres of which 100,281 acres were on the North Western Canal, 88,877 acres on the Rohri Canal and about 121,000 acres in the Begari Canals Division.

The total area of " bajri " was 476,809 acres of which 148,558 acres were on the Eastern Nara and 151,747 acres on the Rohri Canal.

The total area of " cotton " was 344,112 acres of which 233,022 acres were on the Eastern Nara and 84,377 acres on the Rohri Canal.

The principal crops during rabi were " wheat " and " oil-seeds ". Wheat was largely grown on the Eastern Nara, North Western and Dadu Canals and oil-seeds on the North Western, Begari and Rohri Canals. The largest area under " other crops " in Rabi was in the Begari Canals Division.

27. The duties and deltas obtained on the canals are detailed for each canal in the following statement :—

Canal.	Year under report.				Last year.		Remarks.
	Duty acres per cusec.		Delta feet.		Duty Acres per cusec.	Delta feet.	
	Kharif.	Rabi.	Kharif.	Rabi.			
1	2	3	4	5	6	7	8
Rohri Canal System	61	36	5·0	9·0	..	..	
Eastern Nara System	48	43	7·5	8·3	..	..	

Canal.	Year under report.				Last year.		Remarks.
	Duty acres per cusec.		Delta feet.		Duty Acres per cusec.	Delta feet.	
	Kharif.	Rabi.	Kharif.	Rabi.			
1	2	3	4	5	6	7	8
North Western Canal System ..	65	70	5·6	5·1	..	..	
Rice Canal System..	55	..	6·6	..	..	..	
Dadu Canal System	49	75	7·2	4·8	..	..	
Desert Canal ..	59	..	4·64	..	56	4·14	
Unherwah ..	55	..	5·6	..	54	6·22	
Begari Canal ..	68	..	4·9	..	57	7·68	
Sukkur Canal ..	..	..	..	..	53	5·13	Now abandoned as such.
Canals in Rohri ..	20	..	11·30	..	27	7·63	
Sind Canal ..	38	..	5·6	..	48	5·12	
Rajib Canal ..	49	..	4·57	..	42	4·62	
Chitti Canal ..	58	..	3·9	..	62	3·16	
Garang Canal ..	45	..	4·7	..	39	4·62	
Pinyari Canal ..	47	..	6·0	..	44	7·9	
Sattah Canal ..	28	..	7·5	..	22	10·9	
Baghar Canal ..	36	..	7·1	..	7	50·8	
Sarfraz Canal ..	38	..	5·9	..	61	3·9	
Kari Shumali ..	..	..	..	..	76	3·6	Now abandoned.
Nasirwah ..	23	..	9·9	..	49	4·5	
Fuleli Canal ..	55	90	6·7	3·6	Kharif 46	7·8	
					Rabi 63	5·8	
Mahiwah ..	41	..	5·9	..	42	5·81	
Kalri Canal ..	52	..	4·1	..	17	15·2	
Hassanali Canal ..	31	..	7·2	..	30	8·5	

Note.—Low duties accounted for by undeveloped state of newly opened canals.

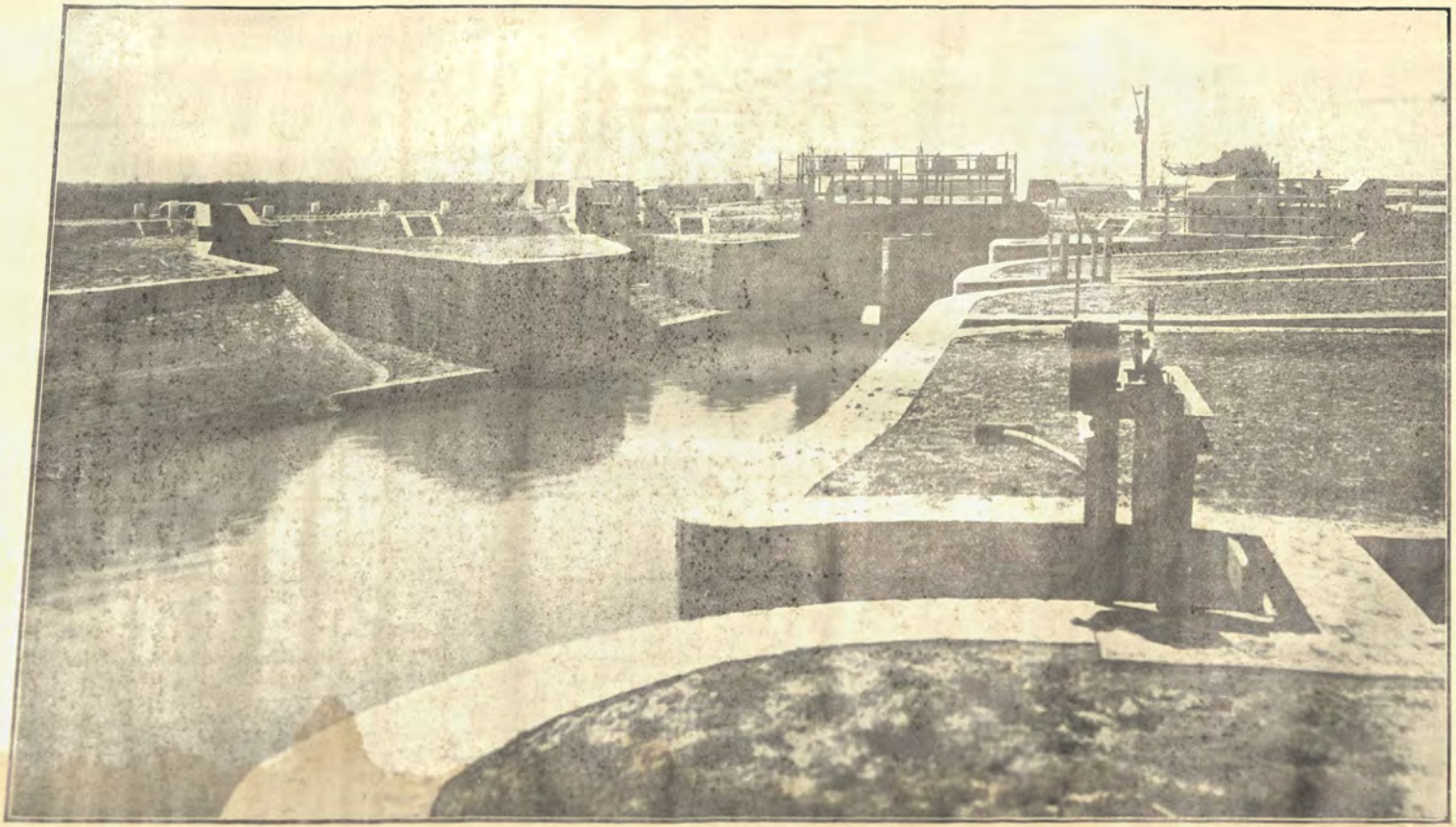
Incidence of working expenses.

28. On the "Productive" works classed under "55—Construction of Irrigation, Navigation, Embankment and Drainage Works," the incidence of working expenses on assessed revenue and per acre irrigated were as under :—

	On assessed Revenue.	Per acre irrigated.
	Rs.	Rs.
Barrage Canals ..	47·00	1·86
Inundation Canals ..	64·00	1·40

The incidence of working expenses on the "Unproductive" works was 80·0 on assessed revenue and 1·8 per acre irrigated.

29. The total value of crops grown on the irrigated area of 39,35,139 acres, as estimated by the Revenue authorities, was Rs. 7,07,30,646 which gives an average value of Rs. 18 per acre.



A group of regulators at Dostali. R. D. 266,787 of Warah Branch, North Western Canal.

30. The following table shows the total number of ordinary wells in actual use, total area irrigated by them etc. in Sind :—

Total number of ordinary wells in actual use.	Total area irrigated by wells shown in column 1 during 1932-33.	Total number of wells in working order but not used.	Total number of abandoned wells
1	2	3	4
Acres.	Acres.	Acres.	Acres.
13,080	34,174	24,736	1,595

4. DETAILS OF DIFFERENT WORKS OR GROUPS OF WORKS AND A COMPARISON OF THE AGRICULTURAL AND FINANCIAL RESULTS OF THE YEAR 1932 33 WITH THOSE OF THE PREVIOUS YEAR AND THE AVERAGE OF THE LAST TRIENNIUM.

(a) Works for which Capital Accounts are kept.

(1) PRODUCTIVE.

LLOYD BARRAGE AND CANALS.

31. The scheme consists of a Barrage or Weir across the river Indus, three miles below the gorge at Sukkur, with the following three canals on the Right Bank and four on the Left Bank, taking off therefrom, each with a separate Head Regulator :—

Right Bank.	*Left Bank.*
(*i*) North Western Canal.	(*iv*) Eastern Nara.
(*ii*) Rice Canal.	(*v*) Rohri Canal.
(*iii*) Dadu Canal.	(*vi*) Khairpur Feeder East.
	(*vii*) Khairpur Feeder West.

The project is designed to secure perennial irrigation to the areas comprising parts of Upper Sind Frontier, Sukkur, Larkana and Dadu Districts and of Nasirabad Tahsil of Baluchistan on the Right Bank of the river Indus and areas in the Nawabshah, Thar Parkar and part of the Hyderabad Districts on the Left Bank of the river Indus.

The area under command in the British Territory amounts to 7,406,000 acres of which 5,042,000 acres will be cultivated annually on attainment of full development. The area irrigated in the Barrage Zone prior to the opening of the new canals, was according to the latest corrected figure 2,037,000 acres annually and the increased irrigation provided for will therefore amount to 30,05,000 acres.

The Barrage and Canals were formally opened by His Excellency the Viceroy on the 13th January 1932 and the year under report is the first working year of the new canals. All the new canals took their supply from their new head regulators except the Eastern Nara which continued to take supply from its old head.

(*i*) *North-Western Canal System.*

The system comprises the North-Western Canal and the Warah, Ratodero, Shahdadkot and Khirtar Branches. The new Canal stood the wetting comparatively well and a few breaches that occurred in the beginning were promptly closed without any damage to cultivation.

The supply in the tail reaches of some distributaries and minors was deficient during the kharif and the cultivation on the Ratodero and Shahdadkot Branches was accordingly not very satisfactory. On the Khirtar Branch, however, the supply was very good and the cultivation much beyond expectations.

(*ii*) *Rice Canal System.*

The system comprises the Rice Canal and the Ghar, Dhamrao and Mehar Branches. The Rice Canal was opened on the 10th April 1932 with a discharge of about 500 cusecs. The canal worked satisfactorily and being a Kharif Canal was closed entirely on the 19th November 1932.

(*iii*) *Dadu Canal System.*

The system comprises the Dadu Canal and the Johi Branch. The canal was opened on the 13th January 1932 for testing purposes. As the canal runs through kalar soil, numerous leaks occurred which were however closed without any damage. Considerable damage was however caused by hill floods to a large area in the Southern Dadu Division and affected the development of cultivation in those areas.

(*iv*) *Eastern Nara System.*

The system comprises the Eastern Nara, Jamrao Canal with its branches, Mithrao Canal with its branches, Khipro Canal with its branches and the Hiral and Thar Canals.

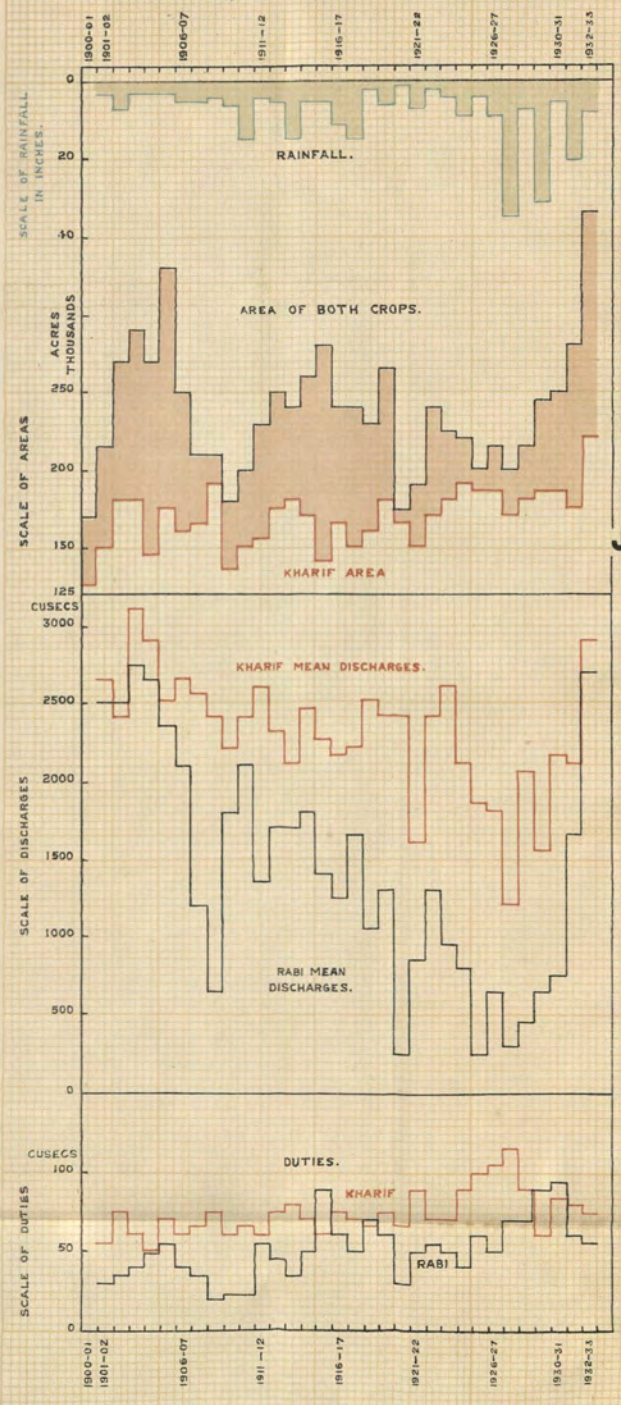
The system worked very satisfactorily and there was marked increase in cultivation.

A heavy flood came down during the year and 3 cuts were given to the Nara Bunds to relieve the pressure against the left bank. The main Nara was also breached on the left bank. The breach and the cuts were successfully closed.

(*v*) *Rohri Canal System.*

The system comprises the main Rohri Canal with the following branches :—

(1) Naulakhi.
(2) Mehrabpur.
(3) Sehra.
(4) Nasrat.
(5) Dad.
(6) Thul.
(7) Hala.
(8) Alibahar.
(9) Shahdadpur Jam.
(10) Tando Adam.
(11) Hyderabad.
(12) Nasir.
(13) Sarfraz.



JAMRAO CANAL

WORKING RECORD UP TO 1932-1933

NOTE:—

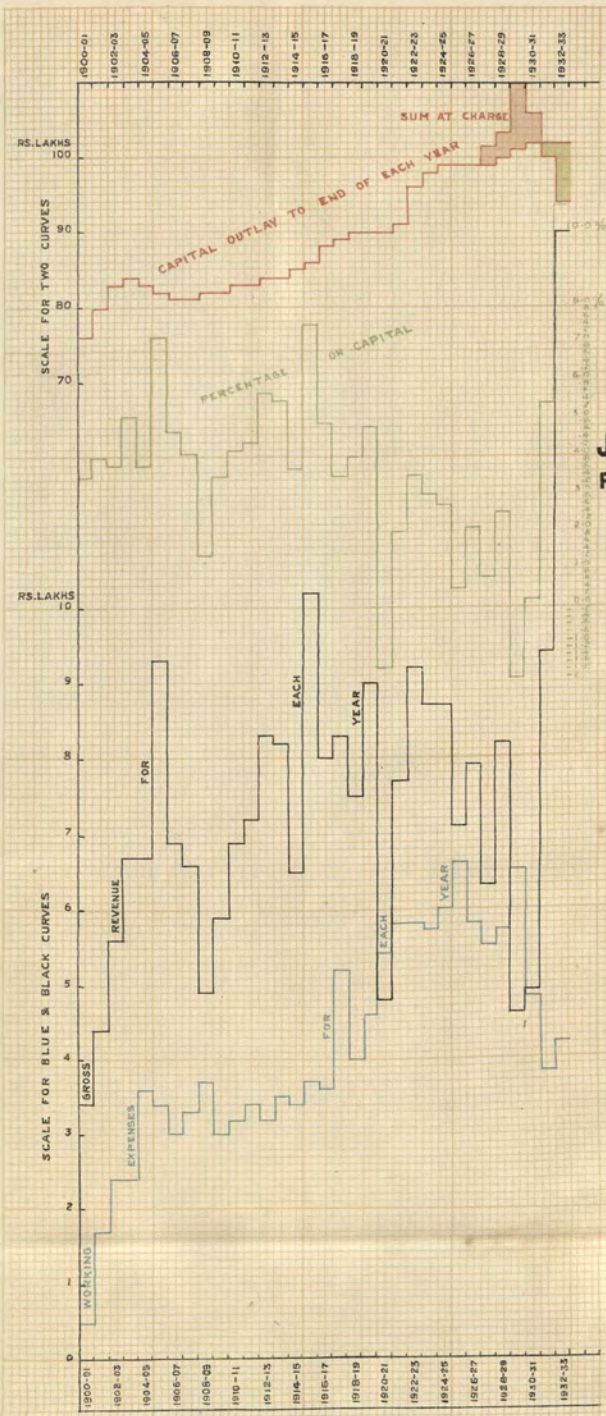
(1) The intercepts in the red area show the rabi area each year.

(2) The discharges are average discharges at head calculated on the total number of days of the season concerned.

(3) The duties are calculated on the above areas and discharges.

(4) The rainfall is average rainfall for all the stations on the canal.

G.P.Z.O. Poona, 1934.



JAMRAO CANAL

FINANCIAL RECORD UP TO 1932-33

NOTE:—

(1) Construction commenced in November 1894.

(2) Canal was opened on 24th November 1899.

(3) Intercepts in the red area show the arrears of interest to the end of the year, which, added to the capital give the sum-at-charge.

(4) Intercepts in the green area show repayment of capital from surplus revenue, after paying interest, to the end of the year. These deducted from the capital give the sum-at-charge.

(5) The gross revenue has risen considerably due to the very good season. Working expenses have risen slightly due to the remodelling of all minors.

G.P.Z.O. Poona, 1934.

The kharif of 1932 was the first season in which the new channels began to function and it was a very difficult one with a relatively small demand for water.

Also this was the first year in the history of the tract to get assured rabi supply and naturally the demand for rabi, in a tract where it was practically unknown in the past, was meagre. Propaganda work is required to induce the zamindars to take up rabi cultivation.

The system worked satisfactorily on the whole.

(vi) Manchar Drainage System.

The works which consisted of a new cut from the River near Sehwan, the widening of the Aral Manchar, the construction of the Manchar Containing Banks and the Aral-Laki were completed during the year. The cultivation during the rabi season was satisfactory.

Extensions and Improvements.—A sum of Rs. 2,690 was spent during the year on this head.

Maintenance and Repairs.—The new and the old canals merged into the Barrage Canals were maintained in good order at a cost of Rs. 23,49,022 including works establishment.

Irrigation.—The total area irrigated by the Barrage Canals was 2,310,098 acres of which 1,371,674 acres were kharif and 938,424 acres rabi compared with the total area of 1,643,328 acres cultivated last year in the same tract by the non-Barrage Canals.

Financial Results.—The gross revenue of the Barrage Canals from all sources amounted to Rs. 76,40,836. Deducting working expenses, *viz.* Rs. 38,32,334 and the share due to old pre-British canals Rs. 4,59,530, the net revenue during the year was Rs. 33,72,804.

General Remarks.—The remissions granted during the year amounted to Rs. 9,57,898 compared with Rs. 6,36,107 remitted in the Barrage Zone last year.

The principal crops grown were :—

	Acres.
Rice	443,432
Jowari	251,210
Bajri	303,638
Cotton	317,613
Wheat	644,161
Oil-seeds	92,518

The value of the whole outturn was estimated by the Revenue authorities at Rs. 4,34,13,149 or an average of Rs. 19 per acre.

DESERT CANAL.

32. The new head to the Desert Canal which was opened on the 25th June for feeding the Adiowah was opened late by about 10 days because the Escape Regulator at mile 3/5 of the new cut was under construction.

Erosion continued at the mouth but no silt was deposited. On the contrary the bed scoured by about a foot giving a bed level corresponding to 6·5 feet on Sarhad.

The old head was used, as usual, for feeding the Desert Canal System and to improve the supply, the channel above the Head Regulator was widened during the previous cold weather and this slightly improved the conditions.

The Desert canal system as a whole suffered acutely from deficiency of supply and rotations were introduced throughout the season.

Capital.—No expenditure was incurred under this head.

Extensions and Improvements.—A sum of Rs. 1,497 was spent during the year on providing regulator gates to sluices and crockery in Inspection Bungalow etc.

Maintenance and Repairs.—The canal with its branches was maintained in good order at a cost of Rs. 1,72,177 including works establishment.

Irrigation.—The total area irrigated during the year was 217,100 acres of which 1,27,069 acres were under kharif and 90,031 acres under rabi, compared with 230,968 acres last year and 201,820 acres, the average of the previous three years.

Financial Results.—The gross revenue from all sources amounted to Rs. 3,28,667 compared with Rs. 4,08,427 last year and Rs. 3,08,314, the average of the previous three years. Deducting working expenses, *viz.* Rs. 2,62,487, the net revenue during the year was Rs. 66,180.

General Remarks.—The remissions granted during the year amounted to Rs. 1,84,857, compared with Rs. 1,93,963 remitted last year.

The principal crops grown were :—

	Acres.
Rice	41,071
Jowari	55,279
Bajri	24,348
Wheat	21,729
Oil-seeds	17,177

and the value of the whole outturn was estimated by the Revenue authorities at Rs. 29,57,346 or an average of Rs. 14 per acre.

UNHARWAH.

33. This canal worked satisfactorily during the year. The F.S.L. of 9 feet and over at the Tori stop-gates was obtained for 69 days continuously. At the end of the season the canal was supplemented with water from Haibat Loop Compartment.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—A sum of Rs. 117 was incurred during the year under this head.

Maintenance and Repairs.—The canal with its branches was maintained in good order at a cost of Rs. 52,405 including works establishment.

Irrigation.—The total area irrigated during the year was 107,076 acres, of which 53,017 acres were under kharif and 54,059 acres under rabi, compared with 112,178 acres last year, and 111,372 acres the average of the previous three years.

Financial Results.—The gross revenue from all sources amounted to Rs. 1,82,024 compared with Rs. 2,25,771 last year, and Rs. 1,97,855 the average of the previous three years. Deducting working expenses, *viz.* Rs. 86,080 the net revenue during the year was Rs. 95,944.

General Remarks.—The remissions granted during the year amounted to Rs. 83,552, compared with Rs. 83,376 remitted last year.

The principal crops grown were :—

	Acres.
Rice	13,200
Jowari	20,609
Bajri	15,388
Wheat	13,625
Oilseeds	5,618

and the value of the whole outturn was estimated by the Revenue authorities at Rs. 12,78,567 or an average of Rs. 12 per acre.

Begari Canal.

34. The canal had an excellent supply throughout the season. The Eden and the Sir Canals, the tail branches of the Begari, were also given an excellent supply by the operation of the gates provided in 1929 at karia heads in miles 31 to 76. The new feeder worked extremely well and carried a maximum discharge of 18,000 cusecs. The maximum discharge admitted to the Begari was 8,336 cusecs.

On account of a breach in the Sukkur Begari Bund, several cuts had to be given to Choi Branch to relieve the pressure which resulted in areas in the head reaches getting flooded.

Capital.—No expenditure was incurred during the year.

Extensions and Improvements.—A sum of Rs. 624 was spent during the year on certain minor works under this head and on a survey in connection with project preparation in the Begari Canals Division.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 2,99,901 including works establishment.

Irrigation.—The total area irrigated during the year was 369,031 acres, of which 184,151 acres were under kharif and 184,880 acres under rabi.

compared with 350,758 acres last year, and 384,228 acres, the average of the previous three years.

Financial Results.—The gross revenue of the year amounted to Rs. 6,19,928 compared with Rs. 7,42,044 last year and Rs. 7,27,968 the average of the previous three years. Deducting working expenses, *viz.* Rs. 4,57,543 and the share due to old irrigation, *viz.* Rs. 33,613 the net revenue was Rs. 1,28,772.

General Remarks.—The remissions granted during the year amounted to Rs. 3,38,647 against Rs. 2,94,011 remitted last year.

The principal crops grown were :—

	Acres.
Rice	109,857
Jowari	55,829
Bajri	10,340
Wheat	32,108
Oilseeds	27,793

The value of the whole outturn was estimated by the Revenue authorities at Rs. 56,91,390 or an average of Rs. 15 per acre.

Sukkur Canal.

35. The Sukkur Canal had two heads, one for kharif called the Rahuja Head and the other for rabi known as the old head. The canal beyond mile 5/3 has now been abandoned as it is cut off here by the North-Western Canal. A short length of the old canal is however, retained in use, being incorporated in the Dadu Canal. As there is very little area left on it the Old Head has been completely closed and supply required is drawn from the Rahuja head.

Capital.—No expenditure was incurred under this head.

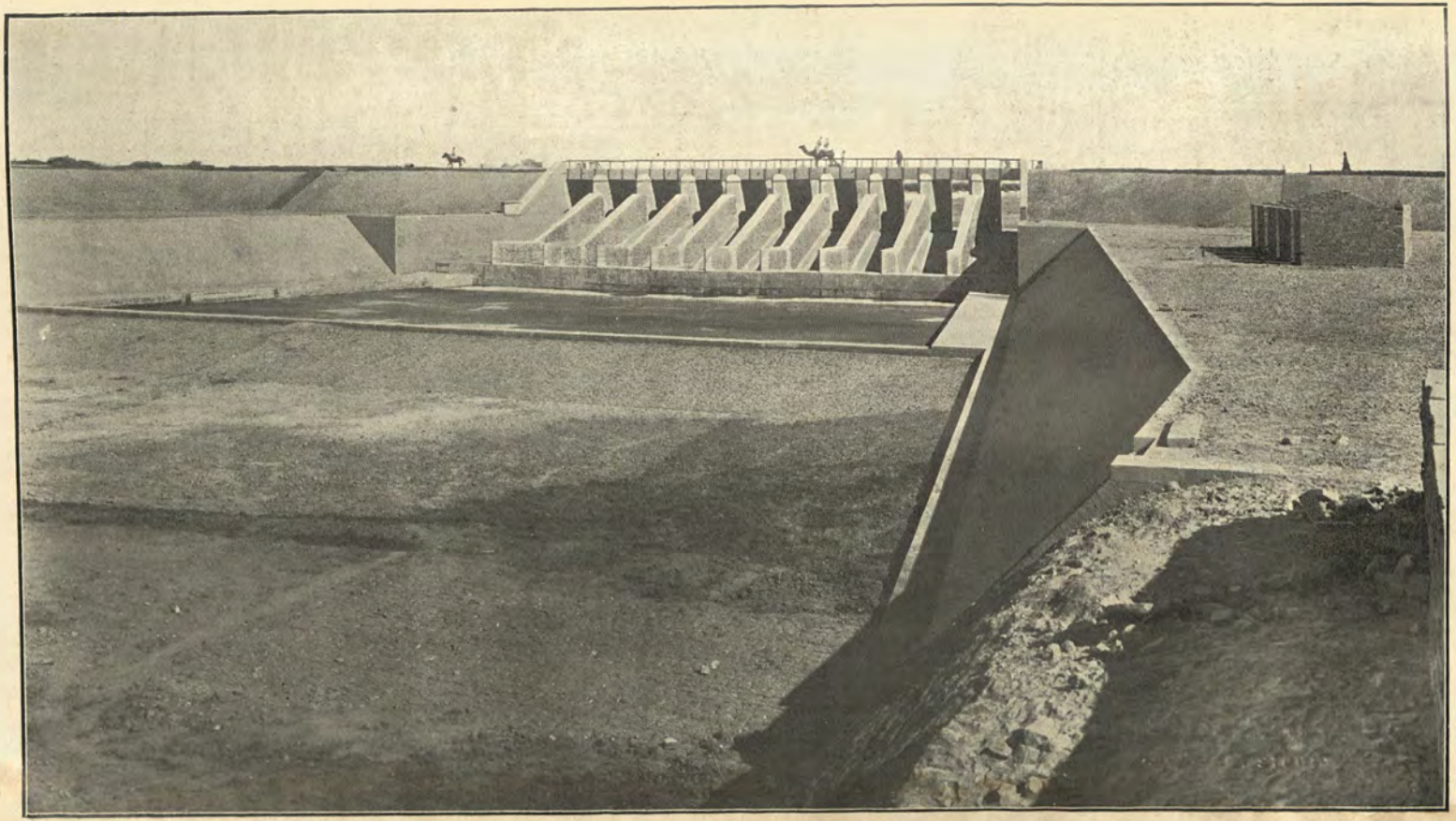
Extensions and improvements.—No expenditure was incurred under this head.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 11,404 including works establishment.

Irrigation.—The total area irrigated during the year was 6,035 acres, of which 1,632 acres were under kharif and 4,403 acres under rabi.

Financial Results.—The gross revenue of the year amounted to Rs. 21,180 compared with Rs. 2,78,150 last year when the whole canal was in operation. Deducting working expenses, *viz.* Rs. 10,988 the net revenue was Rs. 10,192.

General Remarks.—The remissions during the year amounted to Rs. 1,061 compared with Rs. 29,740 remitted last year.



Downstream view of Tando Mastikhan Fall on Rohri Canal.

The principal crops grown were :—

	Acres.
Rice	173
Jowari	1,250
Wheat	2,215
Oilseeds	183

The value of the whole outturn was estimated by the Revenue authorities at Rs. 97,390 or an average of Rs. 16 per acre.

Canals in Rohri.

36. This system comprises small canals situated on the left bank of the river Indus. All the canals worked satisfactorily.

Capital.—No expenditure was incurred under this head.

Extensions and Improvements.—A sum of Rs. 242 was spent under this head on minor works during the year.

Maintenance and Repairs.—The canals were maintained in good order at a cost of Rs. 64,906 including works establishment.

Irrigation.—The total area irrigated during the year was 41,664 acres, of which 29,531 acres were under kharif and 12,133 acres under rabi, compared with 47,583 acres last year and 55,056 acres, the average of the previous three years.

Financial Results.—The gross revenue amounted to Rs. 1,12,681 compared with Rs. 1,18,682 last year and Rs. 1,30,128, the average of the previous three years. Deducting working expenses, *viz.* Rs. 98,259, the net revenue was Rs. 14,422.

General Remarks.—The remissions during the year amounted to Rs. 17,694 against Rs. 18,758 remitted last year.

The principal crops grown were :—

	Acres.
Rice	3,850
Jowari	18,085
Bajri	5,467
Wheat	7,595

The value of the whole outturn was estimated by the Revenue authorities at Rs. 7,65,741 or an average of Rs. 18 per acre.

Sind Canal.

37. The Sind Canal and its branches worked satisfactorily. The bye-river at the head widened itself considerably and hence supply in the channel was ample. No silting occurred at the head and there was little scour throughout the season.

Capital.—A sum of Rs. 9,730 was spent under this head on regrading and moduling channel No. 1 ex. this canal.

Extensions and Improvements.—A sum of Rs. 517 was spent under this head during the year.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 1,04,208 including works establishment.

Irrigation.—The total area irrigated during the year was 78,774 acres, of which 46,072 acres were under kharif and 32,702 acres under rabi, compared with 69,570 acres irrigated last year and 86,171 acres, the average of the previous three years.

Financial Results.—The gross revenue amounted to Rs. 2,33,873 compared with Rs. 2,00,313 last year, and Rs. 2,13,051, the average of the previous three years. Deducting working expenses, *viz.* Rs. 1,60,791 the net revenue was Rs. 73,082.

General Remarks.—The remissions granted during the year amounted to Rs. 53,683 compared with Rs. 44,782 remitted last year.

The principal crops grown were :—

	Acres.
Rice	20,250
Jowari	20,377
Wheat	7,418
Oilseeds	2,382

The value of the whole outturn was estimated by the Revenue authorities at Rs. 10,76,386 or an average of Rs. 14 per acre.

RAJIB, CHITTI AND GARANG CANALS.

38. These canals had a good supply and worked satisfactorily.

Capital.—No expenditure was incurred under this head.

Extensions and improvements.—No expenditure was incurred under this head.

Maintenance and Repairs.—The canals were maintained in good order at a cost of Rs. 13,744 including works establishment.

Irrigation.—The total area irrigated during the year was 21,066 acres, of which 9,369 acres were under kharif and 11,697 acres under rabi, compared with 16,162 acres irrigated last year and 23,180 acres, the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 74,997 compared with Rs. 54,646 last year and Rs. 68,718 the average of the past triennium. Deducting working expenses, *viz.* Rs. 23,730 the net revenue was Rs. 51,267.

General Remarks.—The remissions granted during the year amounted to Rs. 3,893 against Rs. 12,467 remitted last year.

The principal crops grown were :—

Rice	..	..	1,091 acres.
Jowari	..	..	7,056 „
Wheat	..	..	4,879 „
Oilseeds	..	..	570 „

The value of the whole outturn was estimated by the Revenue authorities at Rs. 2,34,858 or an average of Rs. 11 per acre.

Indus Canals—Right Bank.

39. The working of these canals was not quite satisfactory owing to the low river.

Capital.—No expenditure was incurred under this head.

Extensions and Improvements.—No expenditure was incurred under this head.

Maintenance and Repairs.—The canals were maintained in good order at a cost of Rs. 13,865 including works establishment.

Irrigation.—The total area irrigated during the year was 15,399 acres, of which 13,105 acres were under kharif and 2,294 acres under rabi, compared with 16,148 acres last year and 23,477 acres, the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 22,707 compared with Rs. 32,521 last year and Rs. 40,761, the average of the past three years. Deducting working expenses, viz. Rs. 21,006, the net revenue was Rs. 1,701 only.

General Remarks.—The remissions granted during the year amounted to Rs. 20,486 compared with Rs. 11,163 remitted last year.

The principal crops grown were :—

Rice	..	..	10,944 acres.
Bajri	..	..	1,048 „

The value of the whole outturn was estimated by the Revenue authorities at Rs. 2,19,555 or an average of Rs. 14 per acre.

Indus Canals—Left Bank.

40. The working of these canals was not quite satisfactory owing to the low river.

Capital.—No expenditure was incurred under this head.

Extensions and Improvements.—A sum of Rs. 75 was spent under this head during the year.

Maintenance and Repairs.—The canals were maintained in good order at a cost of Rs. 41,281 including works establishment.

Irrigation.—The total area irrigated during the year was 35,956 acres, of which 33,997 acres were under kharif, and 1,959 acres under rabi, compared with 37,154 acres irrigated last year and 39,909 acres, the average of the previous three years.

Financial Results.—The gross revenue amounted to Rs. 72,843 compared with Rs. 93,591 last year and Rs. 89,529, the average of the past three years. Deducting working expenses, viz. Rs. 62,602, the net revenue was Rs. 10,241.

General Remarks.—The remissions granted during the year amounted to Rs. 42,092, compared with Rs. 24,373 remitted last year.

The principal crops grown were :—

Rice	..	..	..	32,233 acres.
Bajri	..	..	..	1,437 ,,

The value of the whole outturn was estimated by the Revenue authorities at Rs. 6,91,170 or an average of Rs. 19 per acre.

Pinyari Canal.

41. The canal flowed for 142 days against 177 days in the previous year. The short cut given to the feeder last year was cleared and groyned. The abrupt fall in the river in September caused silt bars which were removed by means of rakes and the supply was improved. A project for remodelling this system is under examination.

Capital.—No expenditure was incurred under this head.

Extensions and Improvements.—A sum of Rs. 1,237 was spent under this head during the year.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 99,865 including works establishment.

Irrigation.—The total area irrigated during the year was 103,543 acres, of which 89,495 acres were under kharif and 14,048 acres under Rabi, compared with 100,062 acres last year and 98,146 acres, the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 1,88,333 compared with Rs. 2,40,754 last year and Rs. 2,25,895, the average of the last three years. Deducting working expenses, viz. Rs. 1,53,605, the net revenue was Rs. 34,728.

General Remarks.—The remissions granted amounted to Rs. 1,24,132 compared with Rs. 79,689 remitted last year.

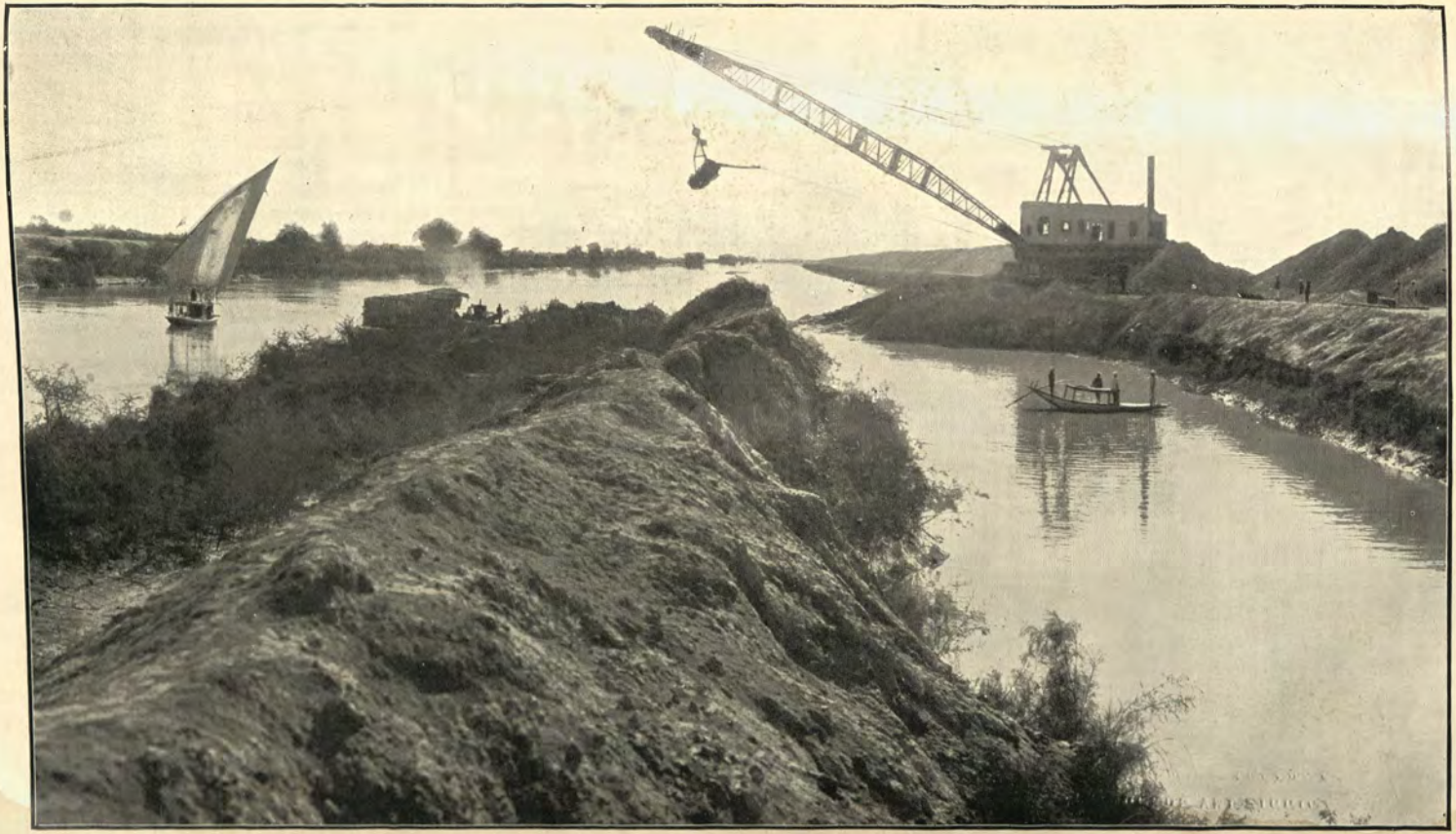
The principal crops grown were :—

Rice	..	..	..	86,167 acres.
Bajri	..	..	..	1,874 ,,
Oilseeds	..	..	..	11,166 ,,

The value of the whole outturn was estimated by the Revenue authorities at Rs. 28,84,240 or an average of Rs. 28 per acre.

Baghar Canal.

42. With the construction of the head regulator in 1927, it is now possible to control the water entering this channel. The new head constructed during the previous cold season worked satisfactorily. Until



Widening of Nara Supply Channel at R. D. 10,300. View from upstream right side showing junction of existing Nara and New Cut. Original width 200′ widened to 300′.

however, extensive improvements are made to the canal—a scheme for which has been prepared and is under consideration—it will not be possible to control effectively the distribution of available supplies or to prevent the wasteful escape of a great part of these to the sea. A tail regulator is necessarily required.

Capital.—No expenditure was incurred under this head.

Extensions and Improvements.—Expenditure of Rs. 250 was incurred under this head during the year.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 56,305 including works establishment.

Irrigation.—The total area irrigated during the year was 28,355 acres, of which 24,997 acres were under kharif and 3,358 acres under rabi, compared with 26,041 acres last year and 33,363 acres, the average of the previous three years.

Financial Results.—The gross revenue amounted to Rs. 32,844 compared with Rs. 40,517 last year and Rs. 64,330, the average of the past triennium. Deducting working expenses, viz. Rs. 81,935 there was a loss of Rs. 49,091 on this canal.

General Remarks.—The remissions granted amounted to Rs. 40,251, compared with Rs. 30,232 remitted last year.

The principal crops grown were :—

Rice	..	..	..	19,013 acres.
Bajri	..	..	..	4,070 ,,
Barley	..	..	..	1,322 ,,

The value of the whole outturn was estimated by the Revenue authorities at Rs. 4,11,996 or an average of Rs. 15 per acre.

Sattah Canal.

43. The canal worked satisfactorily during the year but needs improvements and a project for remodelling it has been sanctioned. This work has, however, been defered until further experience of the effect of the working of the Barrage Canals on the river levels in Lower Sind is acquired.

Capital.—No expenditure was incurred under this head.

Extensions and Improvements.—No expenditure was incurred under this head.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 6,229 including works establishment.

Irrigation.—The total area irrigated during the year was 14,003 acres, of which 13,404 acres were under kharif and 599 acres under rabi, compared with 15,464 acres irrigated last year and 16,096 acres, the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 18,537 compared with Rs. 34,188 last year and Rs. 32,354, the average of the past three years. Deducting working expenses, viz. Rs. 7,564 and the share due to old irrigation, viz. Rs. 16,145, there was a loss of Rs. 5,172 on this canal.

General Remarks.—The remissions granted during the year amounted to Rs. 24,132 compared with Rs. 10,383 remitted last year.

The principal crops grown were :—

Rice	..	..	..	12,352 acres.
Bajri	..	..	..	859 ,,

The value of the whole outturn was estimated by the Revenue Authorities at Rs. 2,97,380 or an average of Rs. 21 per acre.

Sarfraz Canal.

44. Except for a small portion the canal is now out of action as a separate system and forms part of the new Rohri Canal System.

Capital.—No expenditure was incurred during the year under report.

Extensions and Improvements.—No expenditure was incurred during the year under report.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 10,350 including works establishment.

Irrigation.—The area irrigated during the year was 19,974 acres of which 18,949 acres were under kharif and 1,025 acres under rabi, against 22,300 acres irrigated last year and 25,878 acres, the average of the previous three years.

Financial Results.—The gross revenue amounted to Rs. 39,649 against Rs. 54,182 last year and Rs. 46,439, the average of the previous three year. Deducting working expenses, viz. Rs. 14,762 and the share due to old irrigation, viz. Rs. 18,806, the net revenue was Rs. 6,081.

General Remarks.—The remissions granted amounted to Rs. 16,988 against Rs. 1,650 remitted last year.

The principal crops grown were :—

Bajri	..	..	..	11,814 acres.
Cotton	..	..	..	4,919 ,,

and the value of the whole outturn was estimated by the Revenue authorities at Rs. 5,05,134 or Rs. 25 per acre.

Kari Shumali.

45. The greater portion of the old canal has been absorbed by the new Rohri Canal System and only a small portion in the head reaches remains.

Capital.—No expenditure was incurred on any works charged to " Capital ".

Extensions and Improvements.—No expenditure was incurred under this head during the year under report.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 11,372 including the workcharged establishment.

Irrigation.—The area irrigated during the year was 179 acres (kharif 175 acres and rabi 4 acres) against 32,387 acres of last year.

Financial Results.—The gross revenue amounted to Rs. 10,734 against Rs. 71,634 last year. Deducting working expenses, viz. Rs. 16,626, there was a loss of Rs. 5,892 on this canal.

General Remarks.—The remissions granted amounted to Rs. 139 against Rs. 53-0-9 remitted last year.

The principal crops grown were :—

Bajri	..	..	..	121 acres.
Cotton	..	..	..	45 ,,

and the value of the whole outturn was estimated by the Revenue authorities at Rs. 4,638 or Rs. 26 per acre.

Nasirwah System.

46. The system is now out of action except for small portions as it has been absorbed in the new Rohri Canal System.

Capital.—No expenditure was incurred on any work charged to " Capital ".

Extensions and Improvements.—No expenditure was incurred under this head during the year.

Maintenance and Repairs.—The canals and its branches were maintained in good order at a cost of Rs. 11,181 including the workcharged establishment.

Irrigation.—The area irrigated during the year was 12,703 acres (kharif 12,361 acres and rabi 342 acres) against 25,430 acres irrigated last year and 31,368 acres the average of the previous triennium.

Financial Results.—The gross revenue amounted to Rs. 50,592 against Rs. 63,246 in the last year and Rs. 62,335 the average of the past triennium. Deducting working expenses, viz. Rs. 18,650, the net revenue came to Rs. 31,942.

General Remarks.—The remission granted during the year amounted to Rs. 112.

The principal crops grown were :—

Bajri	..	..	..	8,340 acres.
Cotton	..	..	..	3,022 ,,

and the value of the whole outturn was estimated by the Revenue authorities at Rs. 3,66,573 or Rs. 29 per acre.

Fuleli Canal System.

47. The canal is an old arm of the Indus and is 81 miles in length. It has 5 regulators and a 6th one was under construction during the year.

The work of widening the first 5 miles to admit increased discharge into the canal was completed.

In spite of a poor river, the canal worked satisfactorily during the kharif except in the tail reaches where the situation is expected to improve with the construction of modules and pakka outlets.

Capital.—A sum of Rs. 4,09,276 was spent on remodelling the system during the year.

Extensions and Improvements.—A sum of Rs. 2,663 was spent under this head during the year under report.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 2,16,638 including workcharged establishment.

Irrigation.—The area irrigated during the year was 379,183 acres (kharif 326,151 acres and rabi 53,032 acres) as compared with 403,553 acres irrigated in the previous year and 411,540 acres in the average of the previous triennium.

Financial Results.—The gross revenue amounted to Rs. 7,57,100 against Rs. 9,48,609 in the previous year and Rs. 8,23,137, the average of the previous three years. Deducting Rs. 3,24,507 for working expenses and Rs. 2,44,549 for the share due to old irrigation, the net revenue was Rs. 1,88,044.

General Remarks.—The remission granted amounted to Rs. 3,69,999 against Rs. 1,73,931 remitted last year.

The principal crops grown were :—

Rice	..	..	..	236,542 acres.
Bajri	..	..	..	57,907 „
Cotton	..	..	..	17,275 „
Wheat	..	..	..	18,734 „
Oilseeds	..	..	..	17,184 „

and the value of the whole outturn was estimated by the Revenue authorities at Rs. 74,72,367 or Rs. 20 per acre.

Other Canals in Fuleli Division.

48. The canals worked satisfactorily during the year under report.

Capital.—No expenditure was incurred under this head during the year under report.

Extensions and Improvements.—An expenditure of Rs. 19 was incurred under this head.

Maintenance and Repairs.—The canal and branches were maintained in good order at a cost of Rs. 30,786 including workcharged establishment.

Irrigation.—The area irrigated during the year was 24,574 acres (kharif 21,843 acres and rabi 2,731 acres) against 21,335 acres irrigated during the last year and 26,318 acres, the average of the previous three years.

Financial Results.—The gross revenue amounted to Rs. 45,105 as compared with Rs. 52,668 last year and Rs. 49,704, the average of the previous three years. Deducting working expenses, viz. Rs. 46,057, there was a loss of Rs. 952 on these canals.

General Remarks.—The remissions granted during the year amounted to Rs. 15,481.

The principal crops grown were :—

Rice	.. .. ..	13,017 acres.
Bajri	.. .. ..	7,527 „

and the value of the whole outturn was estimated by the Revenue authorities at Rs. 5,71,672 or Rs. 23 per acre.

(2) UNPRODUCTIVE.

MAHIWAH.

49. There was no erosion as occurred last year at the mouth of the Gudu Dhandh, which feeds the Mahiwah system, and therefore the canal worked very satisfactorily.

Capital.—No expenditure was incurred under this head, during the year.

Extensions and Improvements.—No expenditure was incurred under this head during the year.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 78,450 including works establishment.

Irrigation.—The total area irrigated during the year was 75,551 acres, of which 47,686 acres were under kharif and 27,865 acres under rabi, compared with 62,735 acres last year and 75,088 acres, the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 1,65,250 compared with Rs. 1,32,190 last year and Rs. 1,68,408 the average of the previous three years. Deducting working expenses, viz. Rs. 1,08,437, and the share due to old irrigation, viz. Rs. 1,10,497, there was a loss of Rs. 53,684 on this canal.

General Remarks.—The remissions granted during the year amounted to Rs. 21,402 compared with Rs. 24,404 remitted last year.

The principal crops grown were :—

Rice	.. .. ..	9,764 acres.
Jowari	.. .. ..	24,024 „
Bajri	.. .. ..	12,176 „
Wheat	.. .. ..	14,052 „

The value of the whole outturn was estimated by the Revenue authorities at Rs. 7,60,872 or an average of Rs. 10 per acre.

KALRI CANAL.

50. The canal worked fairly satisfactorily and flowed for 120 days.

To bring the unoccupied areas along this canal system under cultivation and to safeguard it against possible adverse effects due to withdrawals of the Barrage Canals, the canal has been remodelled and the amalgamation of water-courses and the construction of modules are in hand.

Capital.—A sum of Rs. 1,75,114 was incurred under this head during the year on remodelling the Kalri and Narichach canals.

Extensions and Improvements.—A sum of Rs. 100 was spent under this head.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 33,096 including works establishment.

Irrigation.—The total area irrigated during the year was 18,310 acres, of which 15,714 acres were under kharif and 2,596 acres under rabi, compared with 13,668 acres last year and 14,508 acres, the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 17,622 compared with Rs. 32,300 last year and Rs. 33,760, the average of the past three years. Deducting working expenses, viz. Rs. 45,723, there was a loss of Rs. 28,101 on this canal.

General Remarks.—The remissions granted during the year amounted to Rs. 38,399 compared with Rs. 7,913 remitted last year.

The principal crops grown were :—

Rice	..	..	..	11,189 acres.
Bajri	..	..	..	3,354 ,,

The value of the whole outturn was estimated by the Revenue authorities at Rs. 3,03,600 or an average of Rs. 17 per acre.

HASSANALI CANAL SYSTEM.

51. The canal takes off from the Indus near Katiar with a head regulator pavement level corresponding to about 5·0′ at Kotri. In spite of the low river, there was a cut off at the head regulator of this canal for over 50 days. The canal worked well.

Capital.—No expenditure was incurred under this head during the year under report.

Extensions and Improvements.—An expenditure of Rs. 1,021 was incurred during the year under report under this head.

Maintenance and repairs.—The canal and its branches were maintained in good order at a cost of Rs. 20,033 including workcharged establishment.

Irrigation.—The area irrigated during the year was 19,976 acres (kharif 19,420 acres and rabi 556 acres) as compared with 18,702 acres irrigated last year and 20,713 acres, the average of the previous three years.

A group of Regulators at the head of Phulji Distributary (D-8-R) ex Dadu Canal.

Financial Results.—The gross revenue during the year amounted to Rs. 46,237 as compared with Rs. 52,052 in the previous year and Rs. 43,170, the average of the previous three years. Deducting Rs. 30,376 for working expenses and Rs. 5,916 for the share due to old irrigation, the net revenue was Rs. 9,945.

General Remarks.—The remissions granted amounted to Rs. 12,509 against Rs. 7,273 remitted last year.

The principal crops grown were :—

Rice	..	..	..	16,087 acres.
Bajri	..	..	..	2,325 ,,

and the value of the whole outturn was estimated by the Revenue authorities at Rs. 4,73,510 or Rs. 24 per acre.

(b) Works for which Capital Accounts are not kept.

River Bunds.

52. The principal bunds are the Kashmore Bund System, the Sukkur Begari Bund System, and the Nara Bund System on the Right Bank of the river Indus. On the Left Bank, the principal bunds are the Flood-Diversion Bund, the Eastern Nara Right and Left Bank Bunds and a line of bunds along the river below the boundary of the Khairpur State to Doulatpur. In the Karachi Canals Division in Lower Sind there are two lines of bunds—one along the right and the other along the left bank of the river. There is also the Flood Protective Bund on the right bank which has been constructed to protect the areas in the Barrage Zone from hill torrents.

Kashmore Bund System.—Several lengths of the bunds were wetted artificially by the use of pumps in advance of their being subjected to river spill water during the abkalani. The water levels obtained during the abkalani were at certain places even higher than those obtained in the record abkalani of 1929. The bunds, however, stood well and only one small breach occurred at mile 1/6 of the Tori Loop due to the collapse of a masonry sluice.

The erosion opposite Tori Loop and the Right Bank Unherwah Mangli continued unabated.

Sukkur-Begari Bund.—There was flood water against the entire length of the Bund from Sukkur to Choi. A breach occurred in the main bund at mile 29/2 on account of the sudden collapse of a sluice. The flood water damaged large areas of kharif crops but there has in consequence been a larger increase in the rabi cultivation. There were also two breaches in miles 34/3 and 2/2 of the bund both of which were successfully closed. Four breaches occurred in the 1913 Loop (Cross Bund) one of which was successfully closed. The remaining three became uncontrollable and the water from these entered the Arain Loop Compartment, necessitating the cutting of the Sarfu Loop to allow of the floods being diverted to the river from the Chiti Canal head.

Flood Diversion Bund.—This bund is on the Left Bank of the river Indus in the Shikarpur Canals Division. There was flood water against this bund also, but it did no harm and the bund stood the pressure well.

Eastern Nara Bunds.—There was considerable pressure against the left bank bunds, necessitating the making of three cuts which were subsequently closed and no damage resulted.

Bunds on Left Bank in Rohri Circle.—The river bunds in British territory stood the pressure of the floods well. One breach occurred in the Khairpur State Bunds but damage to lands in British territory therefrom was averted by the timely closure of the breach.

The Sakrand Dhand which overflowed, due to the river spill water entering it, breached the right bank of Daryakhan wah ex-Indus, which is maintained for feeding this Dhand. The Mari Nakur Bund, the construction of which has since been sanctioned and is in progress, will obviate this danger in future. The breach which threatened the safety of the Tando-Adam Sakrand section of the Sind Left Bank Feeder Railways and of the Rohri Canal, was closed with difficulty and submerged about 700 acres of standing crops.

Bunds in the Karachi Canals.—There was considerable wave-wash against the bund lines and the usual precautions were taken to minimise its action.

The river erosion near Ranta was very active against Mulchand-Shah Bunder Bund mile 23/3 to 24/7 and to save the situation from any mishap, an emergency loop called the Ranta Loop was constructed in a small section in August 1932.

Active erosion was also going on at 3 other places and the provision of retired loops was therefore commenced at those places during the year under report.

Flood Protective Bund.—The bund was threatened by hill torrents and floods from the Khirtar range. The bund, however, withstood the pressure satisfactorily. It has since been strengthened where necessary.

As the bund had not been completed in its entire length, the heavy floods from Baluchistan and the Khirtar range caused damage to areas on the Johi and Warah Branches in the Western Sind Circle.

Extensions and Improvements. A sum of Rs. 1,69,173 was spent during the year on Extensions and Improvements to all the river bunds in Sind.

Maintenance and Repairs. All the bunds in Sind were maintained in good order at a cost of Rs. 10,95,408 including work-charged establishment, compared with Rs. 8,70,309 expended in the previous year.

Irrigation and Financial Results. The total area irrigated by the aid of Bund Systems was 36,591 acres, of which 18,479 acres were in the Kharif and 18,112 acres in the Rabi. The gross revenue amounted to Rs. 53,910 while the working expenses were Rs. 15,22,873.

Gardens.

53. The expenditure on and receipts from gardens during the year are compared below with the figures of the previous three years :—

	Expenditure on the maintenance during the year.	Receipts during the year.
	Rs.	Rs.
1929–30	16,899	1,226
1930–31	16,576	2,649
1931–32	16,944	4,168
1932–33	14,379	4,780

Indus River Commission.

54. The expenditure on all works including surveys carried out during the year under the direct supervision of the Secretary, Indus River Commission, was charged to " 15—Other Revenue Expenditure financed from ordinary revenues—Works for which neither Capital nor Revenue Accounts are kept ".

Survey of Indus.

The main course of the river was surveyed from a point 34 miles above Kashmore to Sakhi—30 miles below the bifurcation at the delta. The total length surveyed during the year excluding the Hyderi and Uchito was 650 miles as compared with 549 miles surveyed during the previous year. Several works in connection with the demarcation of boundaries were carried out.

Gauge Readings and River Discharges.

The daily observations of the river Indus and gauge readings were continued at Sind Site and Panjnad at Daka, Mithankot, Sukkur, Kotri and Tikhar (Jherruck). Discharges were also observed periodically of the Aral Manchar and the Fuleli Canal. Those of the Eastern Nara Channel have been discontinued since the operation of the New Cut to the Eastern Nara.

The natural minimum gauge reading at Bukkur could not be observed this year owing to the working of the Barrage Gates.

Kotri.

At Kotri the maximum gauge reading was 23·7 feet on the 19th August 1932 with a discharge of 4,96,500 cusecs and the maximum discharge was 5,01,100 cusecs with a gauge reading of 23·6 feet on 18th August 1932. The maximum discharge observed at Kotri for practically the same gauge readings are :—

Date and Year.	Gauge.	Discharges.
11th August 1914	23·8 feet.	6,12,200 cusecs
19th August 1924	23·63 „	5,52,900 „

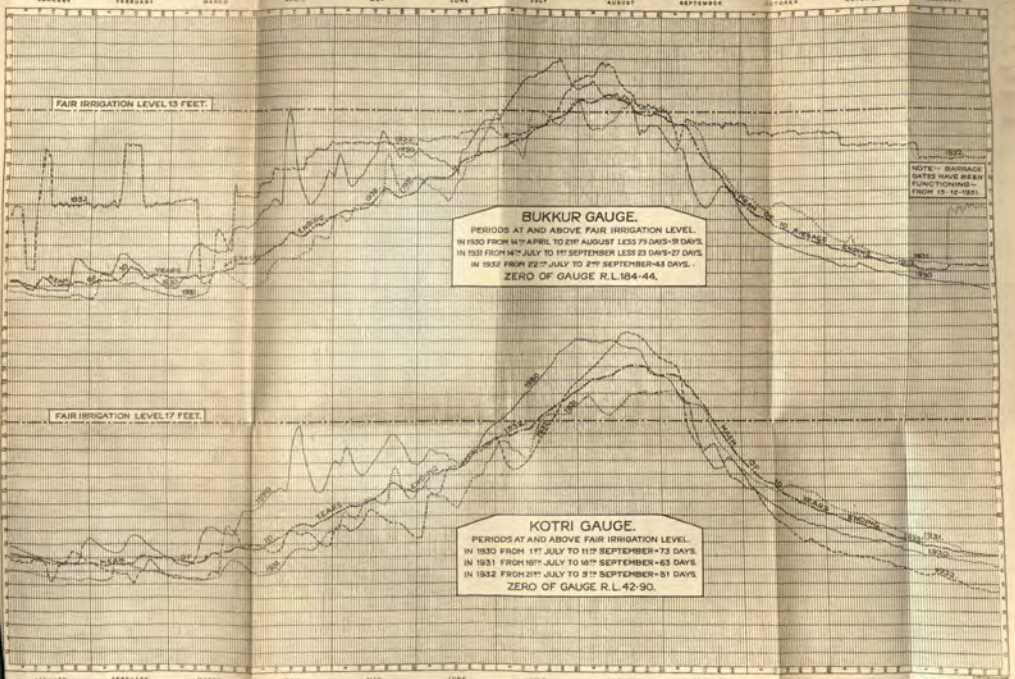
The observed discharge for 18th August 1932 compares favourably with the maximum discharge observed in 1924-25, viz. 5,52,900 cusecs for a gauge reading of 23·63 feet on 19th August 1924.

In the year 1914 the discharge observations were taken by a meter lowered down by means of a cable and in the year 1924 the meter was lowered by means of a rod. These arrangements are not considered to have given such correct results as are obtained by the present rack and pinion arrangement.

The minimum gauge reading during the year under report was 1·45 feet on 17th March 1933 and the minimum discharge of 4,375 cusecs on the same day.

The minimum discharge and gauge reading on that day were the result of cutting off a large portion of the discharge at Sukkur for the purpose of raising the pond level at the Barrage.

HYDROGRAPHS OF THE RIVER INDUS AT BUKKUR & KOTRI.



BOMBAY
BRANCH
OF THE
ROYAL ASIATIC SOCIETY

No. Rev. 1158.

REVENUE DEPARTMENT :

CAMP OF THE COMMISSIONER IN SIND,

23rd February 1935.

Subject.—Irrigation Administration Report—Part II—Sind, 1932-33.

MEMORANDUM.

The Commissioner in Sind presents compliments and, in forwarding the above noted report received from the Chief Engineer in Sind, has the honour to submit the following remarks together with a comparative statement showing the area irrigated and the assessment levied thereon in each of the three years ending 1932-33 and the average for the preceding three years ending 1931-32.

2. The season under report was on the whole better than the last. The inundation may be regarded as having been fairly satisfactory so far as Upper Sind was concerned but rather poor in Lower Sind. The Bukkur gauge reached 10·8 feet on 1st June 1932. Thereafter it continued to rise steadily and attained a maximum height of 16·7 feet on the 11th August 1932. The fair irrigating level of 13 feet was first reached on the 22nd July 1932. This level of 13 feet and over continued till 2nd September i.e. for 43 days as compared with 27 days in 1931, 50 days in 1930, 49 days in 1929 and 42 days the average of last three years. This gauge has, however, ceased to be a reference gauge with the functioning of the Barrage and the Sarhad gauge is now the reference gauge for the inundation canals in Upper Sind. The fair irrigating level of 11 feet as this latter gauge was obtained for 49 days and the maximum level reached there was 14·2 feet. The fair irrigating level of 17 feet on the Kotri gauge was first reached on the 21st July 1932. This or a higher level was maintained for a period of 51 days against 63 days in 1931, 73 days in 1930, 58 days in 1929 and 64 days the average of last three years. On account of the late rise of the river and its sudden and abrupt fall after 9th September, Lower Sind was greatly affected with the result that a large part of the rice crop either failed to reach maturity or was very poor The highest reading in the year was 16·7 feet on 11th August 1932 at Bukkur and 21·6 feet on 1st September 1932 at Kotri compared with 13·9 feet on 30th July 1931 at Bukkur, 19·3 feet on 1st September 1931 at Kotri and the maximum levels of 17·9 and 24·1 feet ever previously recorded on these two gauges.

The Lloyd Barrage canals were opened in the year under review and began to supply water for irrigational purposes for the Kharif season of that year. This has revolutionized the irigational system of the Province the greater portion of which was formerly dependent on inundation canals and somewhat uncertain rains. Central Sind is now getting an assured

and perennial water-supply from the Barrage canals. The performance of these, however, did not in all cases come up to expectations. The initial working of the project was on the whole a great success.

The rain-fall, unlike that in the previous year, was adequate. It was insufficient in the Desert Division of the Thar Parkar district and harmful in the Karachi disrict as there is flooded seed-beds and delayed transplantation. Everywhere else it proved beneficial to the standing crops, helped the growth of fodder and enabled people to undertake barani cultivation in areas not reached by canals.

In the Province as a whole there has been an increase of about 14 per cent. in cultivation on canals and of 42 per cent. in assessment from 30½ lakhs to 35 lakhs of acres and 101 lakhs to 142 lakhs of rupees respectively.

3. The figures of cultivation for the Province as compared with those of 1931-32 and the average of three years ending 1931-32 are given in the statement below :—

As compared with 1931-32.		As compared with the average of the three years ending 1931-32.	
Kharif	Rabi	Kharif	Rabi
+70,000	+3,67,000	—1,04,000	+3,78,000

4. There was a total increase of 2,74,000 acres in the area under cultivation compared with the average of the previous triennium.

5. Remissions of land revenue amounted to Rs. 23,35,000 against Rs. 16,67,000 in the previous year and Rs. 23,87,000 the average of the preceding three years. Of the total remissions, Rs. 8,90,000 were due to deficiency of water supply, Rs. 65,000 due to breaches in canals, Rs. 76,000 due to damage caused by rats and insects, Rs. 1,64,000 due to floods, rains and erosion and Rs. 16,000 due to Kalar against Rs. 5,07,000, Rs. 2,05,000, Rs. 1,20,000, Rs. 65,000 and Rs. 9,000 respectively in the previous year. The other principal causes of remission were as under :—

		Rs.	
(*a*) Frost and adverse winds		2,55,000	
Against	..	39,000	in the previous year.
(*b*) Blight or Mahlo	..	6,000	
Against	..	20,000	in the previous year.
(*c*) New Settlements	..	93,000	
Against	..	132	in the previous year.
(*d*) Percolation	..	33,000	
Against	..	nil	in the previous year.

Besides these, special remissions were granted on account of the fall in prices, which amounted to Rs. 5,53,000.

6. The outstanding balance of land revenue at the end of the year amounted to Rs. 12,81,000 against Rs. 11,28,000 in the previous year and Rs. 11,77,000 the average of the last triennium.

7. The following statement gives details regarding the principal items of expenditure incurred on new works in connection with the several canals :—

Name of canal.	Name of work.	Amount.
		Rs.
1. Sind Canal	.. Regrading and moduling channel No. I ex. Sind Canal.	9,800
2. Fuleli Canal System	.. Remodelling the Fuleli Canal System ..	4,09,000
3. Kalri Canal	.. Remodelling the Kalri and Narichach Canals	1,75,000

In addition to the above expenditure a sum of Rs. 11,000 was spent on providing regulator gates to sluices on the Desert Canal together with crockery in the Inspection Bungalow, survey in connection with project preparation in the Begari Canals Division and extensions and improvements to Manchhur Drainage Scheme, Unherwah, Begari Canal, Canals in Rohri, Sind Canal, Indus Canals Left Bank, Pinyari Canal, Baghar Canal, Fuleli Canal System, Other Canals in Fuleli Division, Kalri Canal and Hassanali Canal.

A sum of Rs. 1,69,000 was moreover spent on extensions and improvements to all the river bunds in Sind and the works connected therewith.

8. The statement below shows the amount spent on maintenance and repairs in the year under report as compared with that spent in the previous year and the average of the three years ending 1931-32 :—

1932-33	1931-32	Average of the three years ending 1931-32
Rs.	Rs.	Rs.
71,82,000	49,49,000	59,32,000

Out of this, the actual expenditure on clearance and repairs was as follows :—

1932-33	1931-32	Average of the three years ending 1931-32
Rs.	Rs.	Rs.
33,65,000	25,31,000	33,00,000

R. E. GIBSON,
Commissioner in Sind.

To

The Secretary to the Government of Bombay, Public Works Department.

Statement showing cultivated area and assessment of Government Jagir and foreign lands for the years 1930-31, 1931-32 and 1932-33 together with average of three years ending 1931-32.

Year.	Area in acres.			Assessment in rupees.
	Kharif.	Rabi.	Total.	
1930-31 ..	2,567,751	679,554	3,247,305	1,06,24,254
1931-32 ..	2,408,604	651,447	3,060,051	1,00,78,400
1932-33 ..	2,478,289	1,018,940	3,497,229	1,42,27,453
Average of three years ending 1931-32. ..	2,582,328	640,844	3,223,172	1,05,36,023

A. P. LeMESURIER,
Assistant Commissioner in Sind.

Irrigation Administration Report, Sind, for the year 1932–33.

GOVERNMENT OF BOMBAY.

PUBLIC WORKS DEPARTMENT.

Resolution No. P. 22/5114.

Bombay Castle, 27th August 1935.

Letter from the Chief Engineer in Sind No. P. 175-W/2, dated 11th February 1935.
Memorandum from the Commissioner in Sind No. Rev. 1158, dated 23rd February 1935.
} Submits the Administration Report of Irrigation Works in Sind for the year 1932–33.

RESOLUTION.—The inundation of 1932 was satisfactory so far as Upper Sind was concerned but not favourable to Lower Sind. On account of the late rise of the river Indus and its sudden and abrupt fall after 9th September 1932 a large part of the rice crop in Lower Sind either failed to reach maturity or gave a poor outturn. The rainfall was adequate.

2. The Lloyd Barrage Canals were opened in the year under review and began to supply water for irrigational purposes in the Kharif season of that year. This has revolutionized the irrigational system of the greater part of Sind which was formerly enitirely dependent on the inundation canals for irrigational supplies. Central Sind is now getting an assured and perennial water supply from the Barrage canals. The initial working of the project was on the whole a complete success.

3. In the Province as a whole there has been an increase of about 14 per cent. in cultivation on canals and 42 per cent. in revenue assessed, viz. from 30½ lakhs to 35 lakhs of acres and from 101 lakhs to 142 lakhs of rupees, respectively.

Irrigation Works.

4. *Cultivation.*—The area irrigated during the year was 3,497,229 acres, an increase of 437,178 acres as compared with the figure of the previous year. This is exclusive of 437,910 acres of "dubari" or twice-cropped land.

5. *Financial results.*—The following table compares receipts and expenditure of the year with those of the previous three years on capital and non-capital irrigation works :—

Year.	Gross Revenue.	Working expenses.	Net Revenue.
	Rs.	Rs.	Rs.
1929–30	78,43,982	73,47,025	4,96,957
1930–31	62,17,252	69,34,199	—7,16,947
1931–32	84,30,500	55,15,923	29,14,577
1932–33	1,12,26,691	73,41,516	38,85,175

6. The capital invested on the irrigation works (including the Lloyd Barrage and Canals Construction Project) for which capital accounts are kept, up to the end of the year under review, was Rs. 27,86,17,270 distributed as under :—

	Rs.
Productive	25,21,41,586
Unproductive	2,64,75,684
	27,86,17,270

7. The net receipts on capital works (exclusive of the share due to old irrigation) amounted to Rs. 45,88,197 which gives a return of 1·65 per cent. on the capital invested. The percentages of the previous three years were as under :—

1929–30	3·58
1930–31	1·30
1931–32	8·11

The variation in the percentage net receipt from 8·11 in 1931–32 to 1·65 in 1932–33 is due to the adoption of a different basis of calculation in each of these two years. In the former year the finances of the Lloyd Barrage and Canals Construction Project were not taken into account in arriving at the percentage return as this Scheme had not been completed at that time, whereas in the latter year the investment in the Lloyd Barrage and Canals Construction Project was included in the capital outlay on which the return is calculated, as the Barrage canals began to function with effect from that year.

8. The rate of working expenses per acre irrigated was Rs. 2·09 as compared with Rs. 1·80 in the previous year.

9. The net consolidated assessment per acre on Government land was Rs. 3·62 against Rs. 2·92 during the previous year.

10. The total value of crops grown was Rs. 707 lakhs, which shows an increase of Rs. 125 lakhs as compared with the figure for the previous year.

By order of the Governor in Council,

J. R. PHILLIPS,

Deputy Secretary to Government,
Irrigation and Railways.

To

The Finance Department.
The Revenue Department.
The Commissioner in Sind.
The Commissioner, Northern Division.
The Commissioner, Central Division.
The Commissioner, Southern Division.
The Chief Engineer in Sind.
All Superintending Engineers of Circles.
The Revenue Officer, Lloyd Barrage and Canals Scheme.
The Senior Superintendent of Land Records, Southern Circle.
The Director of Agriculture.
The Director of Information.
All Collectors in Sind including Deputy Commissioner, Upper Sind Frontier.
The Accountant General, Bombay.
The Audit Officer, Lloyd Barrage and Canals Construction.
All Executive Engineers in charge of Irrigation Works in Sind.

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